



The ***Communicator***

January - February 2026

Are you an Amateur Radio chameleon?

The Bi-monthly Journal of Surrey Amateur Radio Communications



QSK?

---...---

...from the Editor's Shack



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Our article reprint policy is on [page 107](#)

Issues appear bi-monthly, on odd-numbered months, for area Amateur Radio operators and beyond, to enhance the exchange of information and to promote amateur radio activity.

Contributions of articles and photos are welcome.

During non-publication months we encourage you to visit the Digital Communicator at ve7sar.blogspot.ca, which includes recent news, past issues of The Communicator, our history, photos, videos and other information.

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Happy 2026! Let's hope that this is a year of peace, tranquility, good health, and lots of DX. On behalf of SARC, I thank you for your continued support and encouragement. I receive many emails complimenting our work on this publication and to be compared to other Amateur Radio publications such as QST, CQ, 73 and others is indeed an honour.

As a result of one feedback comment, I'd like to share my recommendation for the best method to read The Communicator. Most browsers and PDF readers now offer a 2-page view. If your reader also supports "show cover page separately", as shown in the clip below, then you will enjoy the publication as intended, with facing pages side by side.



I think that you will enjoy the story of Amelia Earhart as much as I did when delving into that piece of history. It turns out that a bit more radio knowledge might have resulted in a happier ending for this remarkable journey.

Lots of other interesting content for you to enjoy. Please keep the comments and suggestions coming to communicator@ve7sar.net.

~ John VE7TI

Surrey Amateur Radio Communications

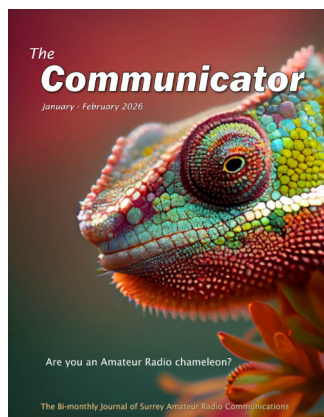
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Do you have a photo or bit of Ham news to share? An Interesting story or link?

Something you are looking for?

eMail it to [communicator at ve7sar.net](mailto:communicator@ve7sar.net) for inclusion in this publication.



This Month's Cover...

A chance conversation about Amateurs who only ever do one thing led to this opinion piece about the chameleon, a remarkable animal that can adapt to suit the surroundings. I hope it may result in some of you exploring another facet of our intriguing Amateur Radio universe. If so, we'd love to hear about it.

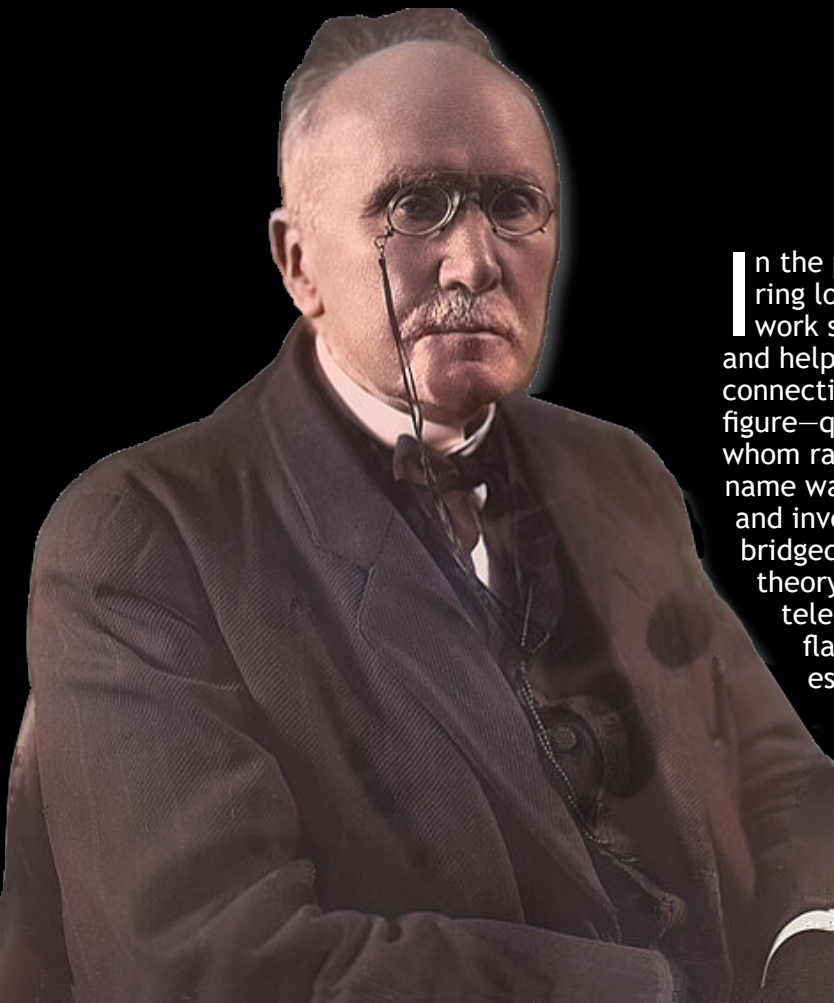
"The chameleon changes colour to match the earth, the earth doesn't change colour to match the chameleon." — Senegalese proverb



The Rest of the Story...

Édouard Eugène Désiré Branly

The Forgotten Conductor of the Wireless Age



In the pantheon of radio's early pioneers, certain names ring loud and clear—Marconi, Tesla, Popov, Hertz. Their work shaped the evolution of wireless communication and helped usher in the modern world of instant, invisible connectivity. Yet behind these luminaries stands another figure—quiet, methodical, and less celebrated, but without whom radio might have taken a very different path. His name was Édouard Eugène Désiré Branly, a French physicist and inventor whose discovery of the coherer in the 1890s bridged the gap between the spark of electromagnetic theory and the first practical systems of wireless telegraphy. Though often overshadowed by his more flamboyant successors, Branly's work provided the essential foundation that made radio detection and transmission possible. His story, as both scientist and teacher, reveals the delicate interplay between careful experimentation and revolutionary insight that defined the dawn of the wireless age.

Born in Amiens, France, on October 23, 1844, Édouard Branly grew up during a period of profound transformation in science and technology.

Édouard Eugène Désiré Branly

1844–1940



The Industrial Revolution had set Europe ablaze with invention, and new understandings of electricity, magnetism, and light were beginning to converge into what we now call electromagnetism. Branly's early education took him through the rigorous French system, culminating in studies at the École Normale Supérieure, one of the elite institutions that trained France's scientific and intellectual leaders. He earned his doctorate in physical sciences in 1873, a time when James Clerk Maxwell's equations—linking electricity and magnetism through a unified theory—were just beginning to circulate among the continent's physicists. These were exciting years, and Branly found himself drawn to experimental physics, particularly to the mysterious new phenomena associated with electrical conduction and electromagnetic waves.

After completing his studies, Branly became a professor at the Catholic University of Paris, where he taught physics and directed a laboratory for experimental research. His academic life was steady and industrious, and though not particularly famous at first, he was respected among his peers for his precision and clarity of thought. By the late 1880s, Branly had turned his attention to the problem that would make his name immortal—understanding how electromagnetic waves could influence electrical conduction in materials. His experiments were inspired by the groundbreaking work of Heinrich Hertz, who in 1887 had demonstrated that

electromagnetic waves could travel through air and reflect from surfaces, behaving in all measurable respects like light waves. Hertz's discovery confirmed Maxwell's theories, but it remained a laboratory curiosity. No one yet knew how to harness these waves for communication—or even how to detect them efficiently at a distance.

Branly's Coherer



It was into this scientific landscape that Branly introduced a deceptively simple but transformative device: the radioconductor, or as it became widely known, the coherer. His

earliest description of the phenomenon came in 1890, in a paper titled "Variations de conductibilité sous diverses influences électriques" ("*Changes in Conductivity Under Various Electrical Influences*"), published in Comptes Rendus de l'Académie des Sciences. In that paper, Branly reported a curious effect he had observed while experimenting with metal filings contained in a glass tube. Under normal circumstances, the filings were poor conductors, offering high resistance to an electrical current. But when subjected to distant electrical sparks—such as those produced by a Leyden jar or an induction coil—the resistance suddenly dropped, and the filings began to conduct electricity much more readily. In other words, the electromagnetic waves generated by a spark seemed to "cohere" the metal particles, creating temporary conductive bridges between them. The material, once activated by the wave, would stay in this low-resistance state until it was physically tapped or shaken, after which it returned to its original insulating condition.

This strange and delicate behavior—resistance that could be "switched" by an electromagnetic impulse—was precisely what the world of experimental physics had been waiting for. Branly's coherer was the first practical detector of radio waves. Unlike Hertz's spark-gap receivers, which required direct electrical connection or visible sparks, the coherer could respond to electromagnetic waves transmitted through space, at a distance. Branly had, in effect, provided a means of turning the invisible vibrations of the ether into measurable electrical signals. Though he himself did not immediately foresee its use in communication, the coherer opened a new frontier.

The implications were not lost on others. In Russia, Alexander Popov built upon Branly's principle to create a lightning detector that could pick up distant electrical discharges. In England, Oliver Lodge independently replicated Branly's experiments and coined the term "coherer" to describe the effect. Lodge's demonstrations in 1894 made headlines, and he was quick to credit Branly's pioneering work as the foundation of his own.

Across the Channel, a young Italian named Guglielmo Marconi took the coherer out of the laboratory and into the field. By 1896, Marconi



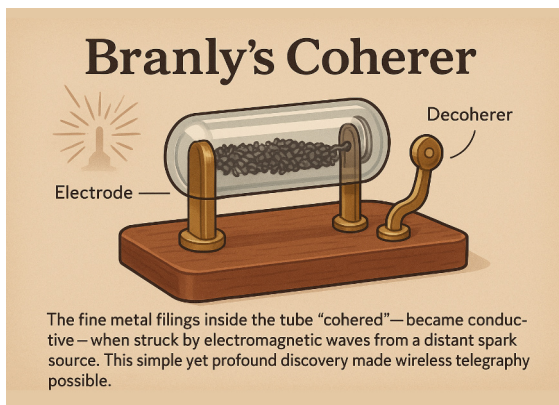
had combined Branly's detector with improved transmitters, antennas, and grounding systems, producing the first practical system of wireless telegraphy. When Marconi sent the letter "S" across the Atlantic in 1901, the faint clicks heard in his receiver were registered by a Branly-style coherer.

In the history of radio, such transitions—from laboratory curiosity to technological revolution—are rarely linear or fair. Branly, the careful academic, did not commercialize his discovery or pursue fame. He was content to publish his findings and continue refining his instruments, leaving others to adapt them for broader use. This modesty partly explains why his name faded from popular accounts, even as his invention became the beating heart of the new wireless world. For nearly two decades—from the 1890s through the first decade of the 20th century—virtually every wireless receiver on Earth used some form of coherer derived from Branly's work. It was the essential link that allowed Morse code to leap off the wires and into the ether.

The coherer's operation, though simple in concept, fascinated scientists and engineers alike. Typically, it consisted of a small glass or metal tube partially filled with fine metallic filings—often nickel, silver, or iron—and fitted with two electrodes. When a radio signal (produced by a distant spark transmitter) induced a tiny voltage across the electrodes, the metal filings would coalesce or "cohere," lowering the electrical resistance by several orders of magnitude. This sudden increase in conductivity could then trigger a relay or sounder, registering the incoming signal as a dot or dash in Morse code. After each pulse, the coherer needed to be "decohered"—usually by a gentle mechanical tap that restored its high resistance state. While crude by modern standards, this electromechanical dance was the birth of radio detection.

Branly's own investigations into the physics of the coherer continued for many years. He experimented with different materials and

configurations, noting that the effect depended on surface oxidation, contact pressure, and the nature of the electromagnetic disturbance. He explored not just metal filings, but also carbon, mercury, and other conductive substances. His work deepened understanding of contact resistance and surface conduction—phenomena that would later prove essential in the development of semiconductor devices. Though the coherer was eventually replaced by more sensitive detectors, such as the electrolytic detector, the magnetic detector, and ultimately the vacuum tube diode, Branly's fundamental discovery—that electromagnetic waves could alter the electrical properties of a material—remains one of the key conceptual bridges between classical electromagnetism and modern electronics.



Branly's scientific career extended far beyond his work on radio. He was a prolific experimenter in electrostatics, thermoelectricity, and the physics of materials. Yet his personality remained remarkably humble. Descriptions from his contemporaries portray a soft-spoken man devoted to teaching, with a quiet religious faith that

harmonized rather than conflicted with his scientific curiosity. He taught generations of French students, emphasizing careful observation and empirical rigor. When the French Academy of Sciences sought to honor him, he initially demurred, insisting that his contributions were modest. In 1911, however, he was elected to the Académie des Sciences, and in 1912, the University of Paris renamed its physics laboratory the Laboratoire Édouard Branly in recognition of his influence. He continued teaching until his retirement, and even in old age he remained engaged with the rapid developments of radio and electronics that his early work had made possible.

The First World War brought an abrupt shift in the world Branly had helped shape. Wireless communication—once a scientific novelty—became a critical military tool, transforming tactics and intelligence. Branly, by then in his



seventies, watched as armies and navies used radio to coordinate movements across continents and seas. The same invisible waves that had once tickled metal filings in his lab were now carrying coded orders, distress calls, and news of victories and losses. Though he had never sought military or industrial application, his work was now woven irreversibly into the fabric of global technology.

In his later years, Branly received numerous honors from both scientific and religious institutions. He was named a Commander of the Legion of Honor, one of France's highest distinctions, and received honorary degrees from universities across Europe. In 1913, Pope Pius X awarded him the Baconian Medal, recognizing his contributions to science as an embodiment of the harmony between faith and reason. These accolades, though gratifying, did not alter his quiet demeanor. Those who met him in his final decades found him courteous and modest, more interested in discussing new experiments than in recounting his own achievements.

Édouard Branly died on March 24, 1940, at the age of 95, just months before France fell to German occupation in the Second World War. His funeral was at the Notre-Dame cathedral in Paris and was attended by the President of France,

Albert Lebrun. He was interred in Père Lachaise Cemetery in Paris. His passing marked the end of an era—a direct link to the age of Hertz and the birth of radio. By then, the world was already communicating through shortwave, broadcast networks, and experimental television. Yet every receiver, from the simplest crystal set to the most advanced radar, still owed something to the

principle Branly had uncovered half a century before: that electromagnetic waves could be detected and converted into electrical signals through their subtle influence on matter.

Today, Branly's legacy endures in both tangible and symbolic forms. The Musée Édouard Branly in Paris preserves his laboratory instruments, notebooks, and early coherers, offering visitors a glimpse into the patient craftsmanship of 19th-century experimental physics. His name also lives on in countless textbooks and historical studies, where he is rightly credited as the man who made radio reception possible. Still, outside of academic circles, Branly remains less well known than Marconi or Tesla—a reminder that scientific revolutions often depend as much on quiet observation as on public demonstration.

Modern engineers and radio amateurs alike owe Branly an unspoken debt. His coherer was, in essence, the first detector, and detection lies at the heart of every communication system we use today. Whether we demodulate signals with diodes, transistors, or digital algorithms, we are still performing the act that Branly first revealed—translating the unseen waves of space into tangible electrical form. It is fitting, then, that his work should inspire not only admiration but reflection on the nature of innovation itself. In a world obsessed with instant recognition, Branly's story reminds us that great discoveries often emerge not from the pursuit of fame, but from the persistent curiosity of those willing to listen to the faintest signals.

More than a century after his discovery, the coherer stands as both artifact and metaphor. As a device, it represents the fragile threshold between silence and connection—a handful of metal filings that could, when struck by a distant spark, come alive with conduction. As a symbol, it embodies the spirit of the early wireless age: a time when the boundaries of science and imagination blurred, and when a single idea could bridge continents. Édouard Branly may not have sent the first transatlantic message, but without his quiet insight, no such message would ever have been received.

~





Trials and Errors #66

High Water:

Ham Radio's Role in 2004 Indian Ocean Tsunami

by DAVE JENSEN W7DGJ



Dave Jensen, W7DGJ, was first licensed in 1966. Originally WN7VDY (and later WA7VDY), Dave operated on 40 and 80 meter CW with a shack that consisted primarily of Heathkit equipment. He has published articles in magazines dealing with science and engineering.

Three of Sumatra's most dedicated fishermen were out on the deepest parts of the Indian ocean. It was on this stretch of water that these three hoped to catch a few mahi-mahi. Unfortunately, that fish population had been depleted by commercial companies over the last decade for foreign export; Mahi-Mahi or Wahoo were now a limited and risky catch for smaller boats like the one owned by Bencawan. His wife's father had purchased this boat many years before, a jukung polangan, when fishing close to shore was viable -- but few Westerners would consider it an ocean-going vessel.

Bencawan saw that the morning sky was already clouding up on the Eastern horizon, as expected, for it was the rainy season. As he and his two villager friends began to pull in the drift nets, he noticed something odd. His attention shifted from the catch coming into the boat to the ocean surface where he could see a rhythmic movement of the previously calm surface. Oddly it matched a similar vibration he felt coming to his feet from the bottom of the jukung. As he glanced at his friends, he saw the concerned look on their faces.

Each of them knew what this meant.

[The story of the great Tsunami](#) had been sung for generations on their island, from Grandmothers to babies, from mothers and fathers to their children. It came in song and poetic stories describing the *smong*, or "ghostly wave." They knew that if they didn't move quickly, they or their families could be victims of this particular phantom.

The elephant keepers were having a difficult morning. It had been a gorgeous sunrise, as usual, but their animals were giving them a hard time for an unknown reason. Normally content to be chained to palm trees overnight, these worker elephants had begun to cry and pull at the iron attached to their legs. A number of the larger animals broke free of these chains and took off, running uphill with their keepers chasing after them. It was an event with no logical explanation but one that would be discussed with reverence for those great beasts in the months and years to come.



In early December of 2004, the Indian ham organization NIAR (National Institute of Amateur Radio) pulled off a minor miracle.

As one of the world's top DX locations, the Andaman and Nicobar Islands had unfortunately been years without an amateur radio presence. These islands were a strategic location for the Indian military, so there was a strong

government limit on accessibility. It's also a tribal location for an indigenous people and with many unusual plants and animals. In short, this beautiful group of over 500 isles had until 2004 been almost impossible to visit on a DXpedition.

But persistence and good networking paid off, as VU2RBI and other NIAR leadership pleaded the case to the Indian Ministry of Communications and Information Technology in New Delhi. Soon, this honor was accorded to Mrs. Bharathi Prasad (VU2RBI) as team Leader, along with VU2DBP, VU3DVS, VU2MYH and VU3RSB. Permission was granted for this team to use the special call signs of VU4NRO & VU4RBI... *the first time in two decades that the VU4 prefix had been assigned.* The team gathered their equipment and, along with international support (primarily from American and German hams) set off for this destination 1200 kilometers from India's coastline.

No one knew, of course, that the DXpedition would be active in the Andaman and Nicobar islands at the same time that the shifting plates of the earth's crust would cause complete chaos and destruction across a wide area, killing nearly a quarter of a million people. Disasters on that scale are hard to imagine.

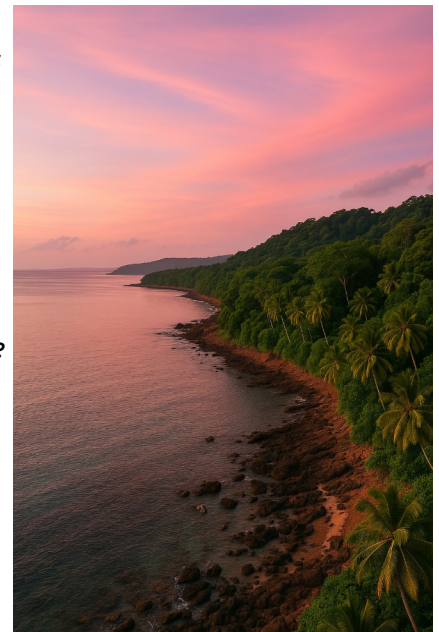
The NIAR DXpedition soon turned from a fun and rewarding ham event into a critical emergency communication exercise for our hams who dropped all DXpedition efforts as the waves struck the islands. Because all communications infrastructure

and Internet on the islands had been taken down by the tragic earthquake and resulting Tsunami, the NIAR team ended up being present for a lifesaving opportunity on the islands. Mrs. Prasad (VU2RBI) and her colleagues held emergency coordination efforts together as the disaster moved to recovery.

Within hours of the great wave hitting the shores of Sri Lanka (where 35,000 died), 4S7VK had set up a communications link between government headquarters in Colombo and stations in the stricken area on the Southern shoreline. Up until that point, all the operational communications equipment in the region consisted of one satellite phone... everything else had been wiped out.

The team was led by Victor Goonetilleke (4S7VK) who at the time was president of the Radio Society of Sri Lanka (RSSL). The Society had only \$200 in funds available, but luckily some equipment had been left behind by a Japanese DXpedition and it was put to use for this critical need. In a voicemail, Victor gave me an eye-opening explanation of the difference between *emergency* communication and true *disaster* communication:

"When I heard those in the area say that they needed at least 1,000 body bags, I knew it was going to require a strong team. Dealing with a disaster, as a radio operator, requires a completely different mindset. There were children running all over looking for their families, half of them with little or no clothing, starving people roaming mad almost, and the stench of animal and human bodies. It was an overwhelming task. Being in a disaster communications role doesn't mean turning on a transceiver and hitching up an antenna and operating... You have to have the mental strength to do your job like a trained combatant in a war zone. You just have to concentrate on doing your job, the one in front of you."





After listening to Victor and the emotion he put into those words, I can tell that this was an indelible part of his life as an amateur radio operator.

One of those who remembered the valiant efforts of the amateurs in the days following the disaster was Arthur C. Clarke, writer and futurist. Clarke lived there during his later years, and he had this to say about this team of ham radio operators:

"We might never know how many lives they saved and how many minds they put at ease, but we owe a debt to Marconi's faithful followers," from an interview conducted by Wired Magazine.



Photo of Clarke in Sri Lanka

In Closure

The list of radio heroes is far too long to repeat here. In each affected country there was an amateur operator or a group of operators who served their population, connecting critical emergency services with those in need -- or providing peace of mind to others concerned about friends and family. This was not a localized event. ...the tsunami traveled at 700 km per hour and reached as far as Somalia, more than 5000 km distant. A local operator there, Burhan (6O0AP) set up the early communication with emergency services and was credited with saving lives.

It was an event that showed the world how "elegant, simple technology" (RF combined with an antenna) can be lifesaving; these efforts also aided amateur radio societies in many countries as they secured wins on spectrum allocation.

~ VY 73, Dave W7DGJ

The original column is at: https://www.grz.com/articles/node_1758492707

PS - Going back to the story in the first few paragraphs, the fishermen and their families survived on Simuelue Island, where only three or four deaths were reported, as their history of Smong taught them their ancestors' lessons about saving lives in tsunamis. It was a huge victory for oral tradition and story-telling.

For the ham who has everything!

A bit late for Christmas giving, but if you have a ham who could use a new key... this is probably not the answer. But if you want an interesting, yet puzzling project, perhaps this ROKR Morse Telegraph Mechanical 3D Puzzle CGM02 is. According to the [website](#):

Create and decode messages with the ROKR Morse Telegraph, a working mechanical machine that transmits messages through gears, lights, and real clicking keys.

~ Thanks to Blake VA7BWG for the tip



The ON7DQ Cute Comb Cootie

by LUC DECROOS ON7DQ / KF0CR



As a member of the SKCC (Straight Key Century Club), I try to participate in their Weekend Sprint (WES), see https://www.skccgroup.com/operating_activities/weekend_sprintathon/

In August, bonus points can be won if you make QSO's with a new homebrew key that you have built especially for this weekend. This year I took a pocket sized plastic comb and made a simple sideswiper (a.k.a. Cootie Key).

My key is very simple to make. All I needed was some pieces of bare printed circuit board, a bit of selfadhesive copper tape, two contact strips from an old relay, and two bolts and nuts. A standard 3.5 mm stereo cable is cut in half, only the tip and the shield are used. It took me about 45 minutes to make. The comb is held between two pieces of PCB, soldered to the base board, and fixed with two 3mm bolts and nuts. The contact strips are soldered to the ground plane,

which connects to the shield of the cable. The copper foil on the comb is connected to the tip of the 3.5mm cable. Note that the contact strips are only soldered at their far ends, so there remains some flexing when sending a DAH.

There is no heavy base, I just clamp the board under my transceiver stand with a piece of wood and a piece of rubber. You could also glue it to your table.

The Comb Cootie keys very smoothly—it has become my favorite key for mechanical keying. I often use it for the NAQCC Monthly Challenge as well.

Here is a demo of the cootie key in action: <https://www.youtube.com/watch?v=njZi5TjCUYo>
I did put the teeth upward, so I can still comb my hair with it (that is, the little hair that I have left). And... I even found a way to comb my hair and generate some sensible Morse Code AT THE SAME TIME!

See this sort video I made: <https://www.youtube.com/shorts/T63bbeTxDgE> and have a laugh.

~ 73 de Luc ON7DQ / KF0CR

Reprinted from the North American QRP CW Club 'NAQCC NEWS' issue #330 December 2025. The website is at: <http://www.naqcc.info>



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News You Can't Lose

Funding opportunities



AMATEUR RADIO DIGITAL COMMUNICATIONS

The mission of Amateur Radio Digital Communications (ARDC) is to support, promote, and enhance digital communication and broader communication science and technology, to promote Amateur Radio, scientific research, experimentation, education, development, open access, and innovation in information and communication technology.

If you or your organization are developing projects that advance amateur radio or digital communications, now's a great time to apply for ARDC grant funding, with our next application deadline on February 1, 2026.

ARDC's priority areas for funding reflect our broader vision and strategy for supporting experimentation, education, and open technology within the amateur radio and digital communications communities. We're especially interested in projects that align with these three areas:

- Research & Development (R&D): open hardware and software systems that enable learning and experimentation (e.g. SDRs, open codec technologies, new modulation techniques).
- Space-Based Communications: projects that create or expand access to satellite communications for amateur radio (AR) and digital communications (DC), engaging communities in wireless experimentation

(e.g. GEO or HEO programs, repurposed commercial satellites, space-based tools for learning).

- Open Source Education: scalable, open educational materials and hands-on projects that make AR and DC more accessible, especially for new learners and clubs (e.g. curricula, videos).

While we welcome proposals across the full range of AR and DC, projects that align with these areas remain a priority in our grantmaking decisions.

Learn more about these priority areas at <https://www.ardc.net/apply/priority-areas-for-funding/>, and find information on eligibility and how to apply at <https://www.ardc.net/apply/>. For additional questions, contact giving@ardc.net.

On our website, we publish our priority areas of funding <https://www.ardc.net/apply/priority-areas-for-funding/>

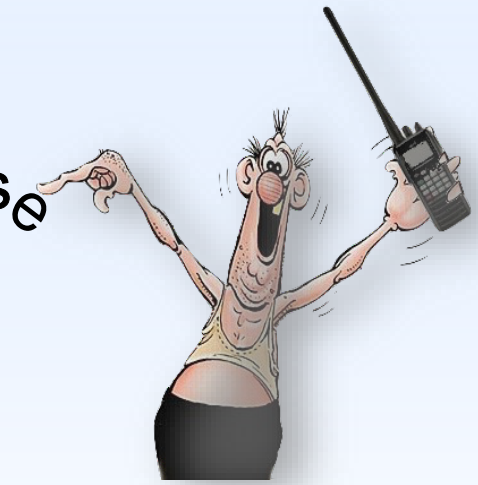
You can sign up for the ARDS newsletter at <https://www.ardc.net/about/newsletter/>

~ ARDC



Page13—News You Can Lose

The Lighter Side of Amateur Radio



The New Year's Ham Baby

Midnight struck! The calendar flipped,
A brand-new baby boy born fully equipped.

But this was no ordinary, cooing tyke,
He burst out screaming... "CQ! Q-R-Z!
gimme a mic!"

His parents, both
veteran 2-letter hams,
were thrilled—not only
by baby,
but the accurate count
on his radiograms.

His first sound was: "dah
dit dah dit, dah dah dit
dah", a properly spaced
CQ,
A perfect fist,
spectacular for a ham
just so new.

Mr. Jones, the neighbor
wasn't as happy.
Just what I need,
another ham next door
like his mama and pappy.

They named him "Kenwood", a name
everyone knew,
but in phonetics, baby confused quite a few.

They bypassed the rattle, the blanket, and
ball,
'cause he only wanted a transceiver with a
nice waterfall.

He skipped "goo-goo" for Q-codes instead:
"My QTH is my bedroom!" is what he often
said.

And change me often when I get wet...
I don't want to risk the high voltage when
I'm on a QSO in bed.



One day, they found
him, in a corner on the
floor,
He'd built a QRP rig they
couldn't ignore.

He keyed up on twenty,
it was truly a feat,
Sending: "Happy New
Year!!!" it sounded so
sweet.

The FCC called, "Is that
your harmonic on the
air?"
His dad just laughed,
"No, sir, that's my son
you hear there.

"He's only seven weeks old, and his signal's
5-9-9"
The New Year's Ham Baby? He's doing just
fine!

~

Radio Ramblings

Encrypted Communications in Amateur Radio

by KEVIN McQUIGGIN VE7ZD / KN7Q

Kevin Ahrens
www.kevskaptures.com



Kevin VE7ZD/KN7Q
is active in EME,
meteor scatter and
much more. He lives
on Vancouver Island.

The Canadian sociologist Harold Innis studied how the evolution of written communication technologies affected the development of civilizations, from antiquity to the present day. Innis theorized that the portability of written information favoured some ancient societies over their adversaries and shaped technological development on a global basis [1].

When written information could be transferred from place to place faster, this allowed it to reach a broader segment of society. Portable written records supported the development of commerce and trade, advances in education, invention of new technologies, diversification of religion and culture, and the bureaucracy of government.

In his 1950 book “Empire and Communications” [2], Innis postulated that efficient transmission of written information is key to the viability of all societies. He makes some good points. I think that his theory holds true as much for the distant past as it does here in the 21st century.

This issue I’d like to look at codes and ciphers and relate them to Innis’ work, and to his theory that as “thought gained lightness” [3] it pushed the envelope both in regard to the speed of communication and the impact of communications technologies upon humanity [2]. Digital communication technologies continue to reshape our social order in amazing (and maybe not the most positive) ways.

ISED’s recent decision to support encryption for amateur radio communication is a very significant development that will allow amateur



radio to continue to innovate and contribute to the radio art [4]. Codes and ciphers play a fundamental role in modern communication systems, so every ham should know a bit about these technologies and how they work.

While developing nations still lag developed nations like Canada in the availability of online communication services, with the globalization of wireless technologies and the Internet we can safely state that “thought” has gained almost infinite “lightness” - at least compared to the limited accessibility and portability of writing engraved on ancient temples.

Let’s look first at the differences between codes and ciphers.

Codes and Ciphers

Codes and ciphers support the security of information, and these tools have played an important role in communications for at least two thousand years [9]. These tools continue to play a key role in modern digital communications, including in amateur radio.

Every amateur is familiar with codes like Morse code and Q signals. These codes are not intended to provide security; rather they are used for convenience and to bridge language gaps between hams during their QSOs. In this article we’ll be discussing “secret” codes used to disguise information!

Encryption utilizes mathematical methods called ciphers to encrypt and decrypt messages. “Plaintext” messages are encrypted using a key to produce “ciphertext”. The ciphertext is transmitted from the sender to the receiver. The receiver uses the key to decrypt the original message. This is called “symmetric” cryptography because the same key is used to both encrypt and decrypt the message. Users without the key cannot easily decrypt the ciphertext.

Everyone who uses the Internet is exposed to ciphers on a daily (if not hourly) basis [17]. These ciphers use a more complex type of encryption algorithm that uses two keys rather than one. This is called asymmetric or “public key cryptography”, and has many operational advantages over single key cryptography. We’ll restrict our discussion in this article to symmetric (one key) ciphers.

Regulatory Permission

While most nations prohibit the use of encryption in amateur radio, Canada is leading other countries in its recognition of the role that encryption plays in modern communications systems.

ISED has recently amended Canadian amateur radio standards to allow encrypted communications in amateur radio as long as the encryption is used improve the efficiency or effectiveness of the transmissions, and not to keep the content of the communications secret.

This permission is a notable development for Canadian hams and sets us apart from amateurs in just about all other nations.

Canadian amateurs are free to experiment with encrypted communications, invent new encryption methods and use them on the air as long as the algorithms for these protocols are published and available for review by ISED and other interested parties. RAC has arranged with ISED to be the official repository of algorithms and keys for the Canadian amateur radio community [10].

The use of codes is still not permitted because, as we will see below, they are unbreakable and their use by hams would violate ITU (international) radio regulations.

This permission from our regulator offers Canadian amateurs a unique opportunity to innovate and experiment with ciphers [11]. As such, I thought that both codes and ciphers would be a worthwhile topic for this column.

It’s a very interesting area and all amateurs should take a look “under the hood” to learn a bit about how they work.

Codes and Ciphers: What’s the Difference?

Encryption, spread spectrum communications, and even data compression are closely linked technologies. Let’s look at the fundamental elements that are common to these areas: codes and ciphers.

Codes and ciphers are both methods of hiding information, but codes are unbreakable, whilst ciphers are not. Analytical methods such as the application of advanced mathematics can



“break” a cipher, while no amount of analysis can break a well-designed code!

A) Codes:

Codes have been used for millennia to hide information from others [12]. A code uses a sign or symbol to represent another sign or symbol, or even an event or process that needs to be hidden from prying eyes. A code may be used as a trigger for a particular response, or may have a pre-defined meaning.

What matters with a code is the agreed upon meaning of each sign or symbol. In an imaginary new code, the word *umbrella* could mean “Vancouver” - or it could mean “attack at dawn”. Or, it could mean “the negotiations with the King have been successful so plan for the celebration dinner next Tuesday”.

The point is that a code word like *umbrella* can mean anything - another word, a trigger for an action, or a detailed explanation of an event or next step. There’s no way of telling.

*No amount of mathematical analysis can deduce what the code word *umbrella* really means in a particular situation.*

Here’s a real world example. As a police officer, I worked undercover buying illicit drugs in the early 1990s. Enforcement of trafficking laws got drug dealers off of the street and arguably saved many lives, as bad drugs were as common back then as they are now.

I had longer hair then and dressed scruffily as I wandered the streets of the downtown east side looking for drug dealers. I was backed up by a cover team that watched me from a distance. They kept me safe, as undercover work has its risks. Radio communication between me and the cover team was not an option.

If I was approached by a drug dealer and made a successful drug purchase, I would *scratch my head*. This code was understood by the cover team to mean that the drug buy was successful and that the dealer should be detained and questioned. If the drug buy was unsuccessful, I would *shuffle my feet* as I continued walking. This code meant “drug buy unsuccessful, I’ll continue looking”.

In this situation, scratching my head or shuffling my walk could have meant anything! Each

action’s meaning depended only on the agreement in advance between myself and the cover team. We could have agreed that scratching my head meant “unsuccessful” and the shuffled walk meant “successful”. No amount of analysis of these “code elements”, even by a supercomputer, could determine the correct meaning of each signal. This is why codes are unbreakable.

So why doesn’t everyone use codes?

Codes may be unbreakable, but they are extremely difficult to deploy and maintain in the field because they rely on a secret *codebook*: a list of code words or signals that translates each signal to its “real world” meaning. General use codebooks would require codes for thousands of common words and phrases. It gets unwieldy very quickly.

Codebooks represent both a *security* problem and a logistical problem:

- Codebooks need to *remain secret* lest unauthorized parties will be able to understand every coded message; and
- Codebooks need to be *distributed to everyone* using the particular code. If a codebook cannot be delivered securely to everyone involved, the code cannot be used effectively.

For the general public, these secrecy and distribution issues have proved insurmountable, so ciphers have largely replaced codes for ensuring the security of communications. Codes still play a role for intelligence services, government and the military as we will see below, but ciphers provide the foundational security for all secure communication.

B) Ciphers:

Ciphers seek to secure communications by applying mathematical rules (an algorithm) to a message (called the “plaintext”) to obscure its meaning using a key (usually a carefully chosen word or phrase), to produce an “enciphered” version of the message called the “ciphertext”. See Figure 1.

```
Fheerl Nzngzhe Engyb Pbzzhavpngvbaf choyvfurf n
zntnmvar pnyyrd "Gur Pbzzhavpngbe"
```

Figure 1 – Ciphertext Encrypted using ROT13 [13]



The enciphered message can then be passed to the receiver over an open network such as radio or the Internet and decrypted by the receiver using either the same key, or another key (related mathematically to the key used to encrypt) that is defined as part of the encryption algorithm. Decryption recovers the plaintext from the ciphertext, and the message can be read.

However, there's a downside to the use of ciphers.

While ciphers don't rely on a codebook, the ciphertext may be analyzed mathematically and "broken" to recover the associated key or keys, which may then be used to decrypt the ciphertext.

Such analysis may take a very, very long time, but it is always theoretically possible. Some ciphers (encryption algorithms) like ROT13 are trivial [13], while others like AES (the Advanced Encryption Standard) are so complex [17] that a brute force attack (an attack against the ciphertext by trying every possible key) would take *one billion billion years*. That's a BIG number!

Quantum computing [17] will render many currently-secure encryption systems obsolete, but that is a topic for a future column.

Ciphers are therefore less secure than (unbreakable) codes, but have the advantage of not needing an agreed-upon codebook between sender and receiver, and with no logistical issues related to distributing the codebooks and keeping them secure and current.

Cryptanalysis

Cryptanalysis is the science of studying encrypted messages seeking to recover the key or keys, and ultimately the plaintext of each message. The process starts with the ciphertext and applies deep mathematical and statistical analysis to it seeking to determine the algorithm used, and then to reverse it to reproduce each message's plaintext.

Cryptanalysis has been around as long and ciphers have been used, and breaking of encrypted messages has played a critical role in wars, governmental struggles and political intrigues over at least the past 2000 years [9].

Cryptanalysis can be trivial (if a weak encryption algorithm has been used), or it can require a monumental multi-year or even decadal effort by dozens or even hundreds of experts. Encryption algorithms and decryption efforts are always centred on current technology, so a cipher that is secure today will likely be broken in the future simply due to the exponential improvements in computing power [5].

Breaking older ciphers such as those implemented by the "Enigma" machines [19] used by the Axis nations during World War II took years of effort by teams of mathematicians from Poland and England, but this cipher can be broken in seconds by modern computing technology.

Example: Breaking a Trivial Cipher

Here's a quick look at how one class of ciphers can be broken.

The ROT13 "substitution cipher" simply replaces each letter in the plaintext with the letter 13 further places down the alphabet. 'A' gets replaced by 'N'; 'B' gets replaced by 'O', et cetera. Plaintext letters in the last half of the alphabet get replaced by "wrapping" the 13 count back around to 'A'. For example, 'W' gets replaced by 'J' and 'Z' gets replaced by 'M'. The plaintext `hello there` generates ciphertext `uryyb gur`.

Breaking this cipher is trivial. Let's look at characteristics of written english.

It has been determined through analysis of large quantities of documents written in english that the most common letter is 'E'. The second most is 'T', the third 'A', and so on. After analysis of millions of english documents, the list of most popular letters is "ETAOIN SHRDLU". I separated the letters into two (strange) words as this makes the letter order easier to remember!

It is important to note that "ETAOIN SHRDLU" just gives the *statistical expectation* for the most common letters in english writing, as determined over a huge set of sampled documents. A specific document's letter frequencies may vary, but *in general* they will not vary from the statistical expectation by much. "ETAOIN SHRDLU" serves as a viable starting point for the cryptanalyst.

Figure 2 – Letter Frequency in a 194-Page English Document [19]

Figure 2 shows the frequency count of letters in an english document I downloaded from the Internet while writing this article. I wrote a short program in Python to count the number of occurrences of every letter and plot the results.

The document is 5,496 lines long, and contains 50,393 words. Note that the most common letters in this document are “ETAION”: this is very close to the statistically-expected “ETAION”. The document’s letter frequency count differs slightly from the expected “SHRDLU”, but is reasonably close, and just knowing “ETAION” will likely be good enough for breaking the encrypted document!

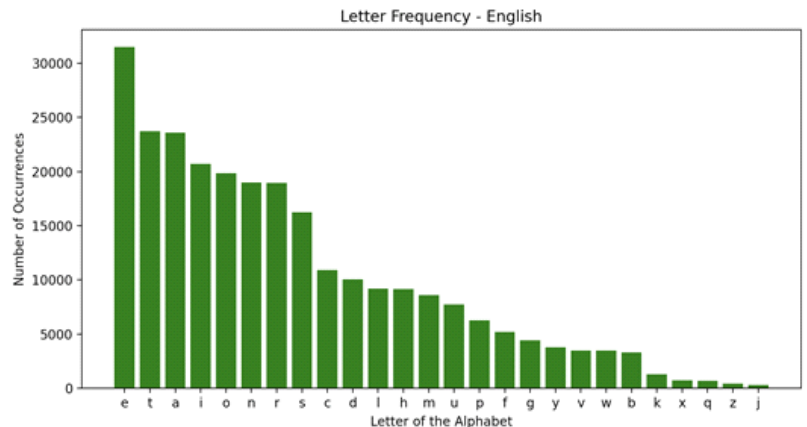
In ROT13, because each letter in the plaintext always gets replaced by the same letter as ciphertext, cryptanalysts can use knowledge of the most common letters in the language to chip away at the ciphertext.

So how does the cryptanalyst break the cipher?

Simply count the number of occurrences of each letter in the ciphertext, and try substituting ‘E’ for the ciphertext letter with the highest frequency. Replace the second most common letter in the ciphertext with ‘T’; the third most common with ‘A’, and so on using the expected “ETAION SHRDLU”.

Before long, a semblance of words will be clear in the ciphertext until you can start making guesses at other ciphertext letters, then words, and in a few minutes the whole message will “fall out”.

Using “ETAION SHRDLU” any english language document encrypted with ROT13 can be broken in probably a few minutes. Computer programs, of course, can help with this decryption and several are available on the Internet. Similar letter frequency tables have been calculated for other languages.



Combining Codes and Ciphers

Worth covering in this overview is the use of “one time pad” encoding. This technique seeks to protect ciphertext from cryptanalysts by applying additional coding to the ciphertext, rendering it unbreakable should it be intercepted by a third party.

While the encrypted ciphertext may be broken and the plaintext of the message recovered, if the message was encoded using a one time pad after it was encrypted, then the plaintext will be inaccessible to the cryptanalyst. *Why?* Because properly implemented coding is unbreakable, as discussed above!

This technique is not applicable for day to use by the public on the Internet, for example, because of all the problems associated with codebooks. However, for governments, the military, or espionage agents, one time pad encoding is useful if:

- A message must be transmitted from the sender to the receiver via an open network such as radio or the Internet; or
- If there is any chance that the encrypted message could be intercepted.

So what is a one time pad, and how does it work?

One Time Pads

A one time pad is a codebook: a shared tool used by a sender and a receiver to encode and decode messages. Historically, it was a booklet with a set of random numbers printed on each page. See Figure 3 for an example of a one time pad that was seized from a Soviet spy as part of a 1960s counter-intelligence investigation in the United States.



0 8							
54048	84038	99541	47661	32157			
83268	19341	64279	92507	97500			
58542	13918	01247	64383	79389			
68712	94286	54894	70559	41792			
57752	80626	94691	55574	45188			
82649	31307	83240	49417	48537			
02724	32494	38807	05391	58183			
90032	78151	25665	35817	02737			
97244	86764	96263	10925	30877			
56426	08685	61282	99993	89835			

Figure 3 – One Time Pad [14]

In our modern times, physical one time pads like this are not really used that much anymore. The random numbers making up the pad will likely be stored digitally on a USB drive, an SD card, or on other digital

media that can be hidden in a safe place. As it is a codebook, security of a one time pad is critical.

The use of random numbers on the pad ensures that there is no way to determine one number on the pad from knowledge of another number. The pad forms a codebook that serves to randomize its input. The only way to get the original input (in this case, the enciphered message) back is by using a copy of the one time pad. This allows the randomization to be reversed, to recover the original message.

The way a one time pad works is that the plaintext message is encrypted using a strong encryption algorithm and then converted to a series of 5 digit numbers. See Figure 4. I'm using the simple ROT13 algorithm to encrypt the plaintext in this example. The conversion from alphabetic to numeric form is performed by converting the message bytes to decimal integers using `hexdump`, an open source computing utility.

Next, the numeric form of the encrypted message (the ciphertext) is encoded using the random numbers on the one time pad. The numbers on the pad are simply added to the

numbers of the ciphertext, to produce a numeric message that can be transmitted safely.

Let's walk through this example.

In Figure 4, the plaintext message "War will be declared next week" is encrypted using a secure cipher algorithm. However, in this simple example I've used the trivial ROT13 algorithm!

The ciphertext message "Jne jvyy or grpynerq arkg jrrx" is then converted to numeric form, where, for example, 'A' gets replaced with 1, 'B' by 2, et cetera [z]. The enciphered message is separated into five digit groups.

Theoretically, if a good encryption algorithm has been used, at this point the message (blue background in Figure 4) should be secure from analysis. Only the sender and the receiver will possess the keys necessary to decrypt the message. Still, a clever eavesdropping mathematician may have developed a way to attack the ciphertext and decrypt it. One time pad (OTP) encoding can be added as a layer of extra security.

How is this done?

Random numbers (black background) are read from the OTP, and each five digit group of the numeric ciphertext (blue background) is added to the corresponding group from the OTP. This generates a set of sums (white background) that represent the encoded, enciphered plaintext.

This is the message that will be transmitted! We've used an (unbreakable) code to encode the enciphered message.

The sender then destroys the page of random numbers used from the one time pad.

Because a OTP-encoded message is unbreakable (remember our discussion of codes above), the security of the original plaintext message has been assured. It can be sent by courier, transferred over the Internet, or even printed on the front page of an old-

Plaintext:	War will be declared next week
Ciphertext (ROT13):	Jne jvyy or grpynerq arkg jrrx
Converted to numeric form (<code>hexdump</code>):	28234 08293 30314 31097 28448 08306 29297 31088 25966 29042 24864 27506 08295 29290 30834 00010
Random values from one time pad:	08660 27497 09781 43981 18569 05356 37074 05330 37010 43318 10307 39519 28068 37920 24038 18439
Summed:	36894 35790 40095 75078 47017 13662 66371 36418 62976 72360 35171 67025 36363 67210 54872 18449

These numbers get transmitted!

By coding the encrypted message, it get protected from cryptanalysis!

Figure 4 – Application of One Time Pad



fashioned newspaper. *Unless an eavesdropper has a copy of the one time pad, the message is unbreakable!*

On the receiving end, the intended message recipient uses her own copy of the OTP to subtract the same random numbers from each five digit group. This reveals the ciphertext. The receiver can then use the shared key (the same key used to encrypt the message) to recover the plaintext. The message has been passed securely!

There are two key requirements for the successful use of one time pads:

- There must be only two copies of the pad: one is held securely by the sender, and the other by the receiver; and
- Each page of the one time pad can be used only once. This is why it is called a “one time” pad.

Reuse of a one time pad gives a significant advantage to cryptanalysts because it creates a mathematical weakness in the coding that can be exploited. Each page must be used only once and then destroyed.

A Short Aside: “Numbers Stations”

Many amateurs are aware of the mysterious “numbers stations” that broadcast on HF frequencies. Numbers stations broadcast sets of seemingly random numbers, generally in five-digit groups. There is much curiosity about what these stations are all about.

Those who follow the subject know that these stations are run by foreign and domestic intelligence services. The transmissions are directed at espionage agents in the field in target nations, to pass messages and requests to them. Agents may also use clandestine transmitters to communicate back to their home nations.

The numbers broadcast represent messages that have been encoded using a one time pad. Agents possess one copy of the one time pad, and the broadcasting intelligence service the other copy.

As a code, then, numbers stations broadcasts are unbreakable. This would be a great topic for a future article, but for our purposes today it's

good to reference numbers stations because they are an example of “codes and ciphers” in action [22].

Encryption: Amateur Radio Context

Okay, let's re-cap. We've covered codes and ciphers and given some examples of how they may be used in practise. Codes are unbreakable, and while ciphers are breakable with lots of computing power, they are “secure enough” for most day to day activities for the average person, or the average amateur radio operator.

Canada is unique in that regulation allow encryption to be used for amateur QSOs. The proviso (as discussed above) is that the keys used by any encrypted amateur activity on the air must be easily available to any other interested party. This will allow anyone intercepting encrypted amateur operation to decode the transmissions as well.

While encryption is allowed, encoding of amateur radio transmissions is not!

Why not? Well, this is because (as we have seen), codes are *unbreakable*. Use of codes would obfuscate (hide) amateur transmissions from other operators and regulatory authorities. Such use of radio is not, nor has never been, in the spirit of the amateur radio service.

A Cop Out?

Some readers may be thinking that this requirement to provide keys makes the use of encryption in amateur radio pointless. This thinking is wrong. The point of incorporating encryption into amateur radio digital QSOs is not secrecy; it is to support experimentation and innovation.

Critics need to consider the intent of the amateur radio service and the basis on which it was founded early in the 20th century.

Amateur radio exists in order to support emergency preparedness and foster training and innovation in radio and communications technology by non-industrial, non-professional researchers. The service is intended to “advance the state of the radio art”.

Governments worldwide know that amateur radio is an important source of innovation; many



mainstream technologies had their start in the amateur radio service - technologies that often had been dismissed as “impossible” or “impractical” by industry giants such as RCA, Marconi, Motorola, and others [15].

Amateur radio innovation continues to this day, and is the reason that governments keep amateur radio services around.

There is much that can be done with encryption in radio communications because encryption is strongly related to the areas of data compression, channel utilization and to potential improvements in the efficiency of radio communications.

Amateur tinkering with on-air encryption can help advance the state of the radio art. It is conceivable (because it has happened dozens of times before) that amateur tinkering may develop some incredible technology or operating technique that will improve efficiency or effectiveness of radio for everyone, not just amateur radio operators.

Government is giving us room to experiment in this area not just because they want hams to be able encrypt their QSOs, but because some fantastic new ideas may come from it. Maybe not, but amateur radio research is unique and there is a fair chance that some new mode or scientific observation may come from us “amateurs” fiddling with encryption and the closely related fields of data compression and multiplexed digital communications.

To close off this discussion, let’s look at how encryption is related to randomization of the message. Interestingly, this aspect of encryption shares several aspects with another leading-edge technology that Canadian amateurs can experiment with, spread spectrum communication.

Impact of Good Encryption

Both encryption and spread spectrum modulation move a particular set of data towards an apparent state of greater entropy (or randomness). When a plaintext document is encrypted, or a signal is processed by a spread spectrum algorithm, a statistical analysis of the ciphertext or the resulting RF signal will show that the data has moved significantly toward a state of apparent randomness. The data stream of the encrypted data will look almost random, and the RF signal’s bandwidth will look very much like noise.

Let’s look at a short example - see Figure 5 below. This is the same type of “letter frequency” diagram that we looked at in Figure 2, above, but this one counts byte value frequencies for an encrypted file [20].

I used an open source tool called OpenPGP (see <https://www.openpgp.org/>) to encrypt the very same text file that I used to generate the letter frequency histogram in the previous figure. Then I ran a similar byte frequency analysis on the encrypted file using Excel.

Take a look at the byte counts in the figure. Note how after encryption there are no dominant byte values in the file: unlike in the text file analyzed in Figure 2, any semblance of dominant byte values (like we saw with the dominant letters “ETAION...” in the text file) has disappeared. Good encryption converts a plaintext message to what looks like random noise.

Changing gears to look at spread spectrum communications, a good spread spectrum algorithm converts the input signal to an output signal that also looks like random noise!

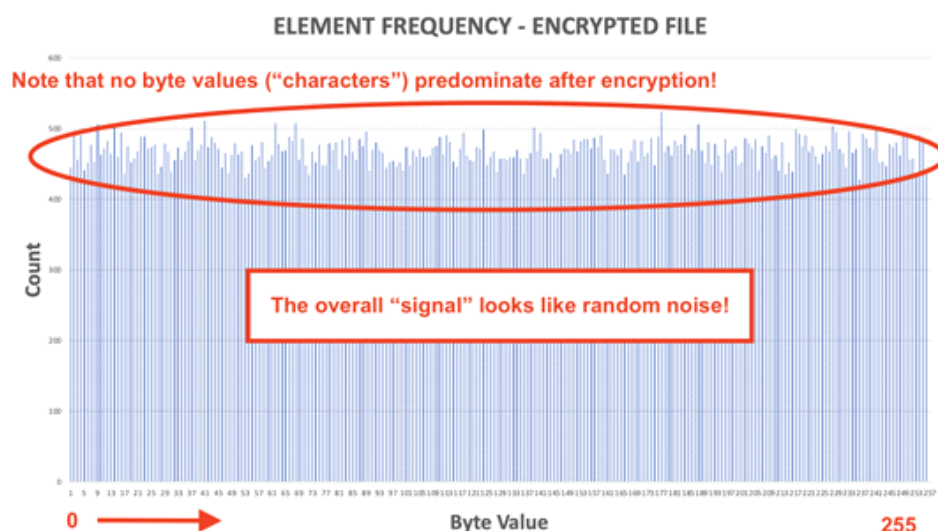


Figure 5 – Byte Frequency in Encrypted File



The two processes are quite similar. Any amateur experimentation with on-air encryption will be closely related to similar experiments that could be performed with spread spectrum algorithms. This might be something fun to tinker with.

Spread spectrum relies on pseudo-random “spreading codes” that allow multiple signals to be “overlapped” in the same bandwidth. The spread spectrum decoding process separates the overlapped signals so that each can be demodulated [21].

Good encryption generates “apparent randomness” because if the plaintext or the RF signal was *truly* converted to random data or RF noise, then the encryption (or spreading) process could never be reversed to regenerate the original plaintext or signal. This would be of no use to anyone!

While not “truly” random, encrypted data (or a spread spectrum signal) is much closer to a true random state than the original information. We can say that it is in a pseudo-random state: the information looks random, but it isn’t *truly* random - it just *looks like* it is.

References

- [1] Harold Innis was born in Ontario in 1894. Following service in World War I he became a professor at the University of Toronto where he studied communication networks. He has been called the father of communications studies. His book “Empire and Communications” is considered a classic and is required reading for all serious students of communication networks and technologies.
- [2] “Empire and Communications” by H. Innis. ISBN 978-0742555082, available at <https://amazon.ca>.
- [3] Innis observed that early writing was labour intensive and not movable. Stonemasons carved writing on massive stone temples and obelisks, and while these writings documented (for example) a king’s great achievements, they were of no practical value to citizens or businesspeople. Writings were stuck in one place until the development of portable media such as papyrus. Information written on papyrus, and later, scrolls, vellum books and (from the 15th century) printed books, allowed information to be stored, catalogued, and easily distributed

This is an interesting subject. I’d encourage any Canadian amateur to start experimenting with on-air encryption, working with RAC, of course, to publish the requisite encryption keys. An experimental platform would not be expensive: a few hundred dollars for a transmit-capable SDR, and all of the required analytical and development software is open source and free. It’s a fantastic opportunity to learn, and who knows what might come out of your experiments!

Conclusion

That’s it for this issue. I hope everyone had a great holiday season. I’m looking forward to the spring and getting my new 1.5 metre dish deployed on EME. I hope to expand my EME activity to 10 GHz as well.

Feedback on Radio Ramblings is always welcome and may be directed to the Editor, or directly to me at mcquiggi@sfu.ca. Thanks for reading!

73,

~ Kevin VE7ZD / KN7Q

between people and geographic regions. Further improvements in technology, including new modes of communication such as the telegraph and radio into the 20th century, increased the portability and utility of written records even further.

- [4] Radio Amateurs of Canada (RAC) manages liaison on encryption issues with ISED and maintains a list of keys currently in use by amateurs who are experimenting with on-air encryption. See RAC’s web page on this initiative at <https://www.rac.ca/encryption/>.
- [5] A top-secret cipher called “RSA” was invented as a secure state-of-the-art cipher by three mathematicians in the USA in 1973, and later adopted by the US and UK governments for secret communications. The cipher fell victim to quickly evolving computing capabilities and can now be broken in a few hours on a typical personal computer. See https://en.wikipedia.org/wiki/RSA_cryptosystem.
- [6] These tablets included teaching materials, administrative records, financial records and information related to the government bureaucracy in the Akkadian empire. See



- "Spreadsheets of empire: red tape goes back 4,000 years" at <https://www.theguardian.com/science/2025/mar/15/stone-tablets-mesopotamia-iraq-red-tape-bureaucracy>.
- [7] See chapter 2 "Media in Ancient Empires" in "Communications in History" by Crowley and Heyer, ISBN 0801312507 at [amazon.ca](https://www.amazon.ca).
- [8] A short book called simply "Papyrus" discusses the invention of papyrus and its amazing effect on society in ancient Egypt. The convenience of portable writing resulted, among other things, in a vast increase in Egyptian governance and bureaucracy. Available through [amazon.ca](https://www.amazon.ca), ISBN 9781605988283.
- [9] An excellent book on the history of secret communication is called "The Codebreakers", by David Kahn. A "classic" for anyone interested in codes and ciphers. [Amazon.ca](https://www.amazon.ca), ISBN 0684831309.
- [10] See <https://www.rac.ca/encryption/>.
- [11] While secret codes cannot be used on the air, hams can experiment with new encryption methods as long as the keys are published on the RAC web site.
- [12] Of course some codes, like Morse code or our Q codes are not meant to hide information but rather to support easier communications and save bandwidth. Nonetheless, they are still "codes"!
- [13] "ROT13" is a simple "substitution cipher" that is used to demonstrate the process of encryption and decryption. It replaces every letter in a message with the letter 13 positions further down in the alphabet. ROT13 can be broken with very little effort and has no practical role in real world secure communications. See <https://en.wikipedia.org/wiki/ROT13>.
- [14] Image from <https://www.cryptomuseum.com/crypto/otp/index.htm>.
- [15] See "Amateur Radio and Innovation in Telecommunication Technologies" by K. McQuiggin at <https://bac-lac.on.worldcat.org/oclc/56920907?lang=en&resource=folderlist>. ISBN 9780612818934
- [16] When you use "https:" in your URLs you are using public key cryptography.
- [17] See https://en.wikipedia.org/wiki/Advanced_Encryption_Standard and https://en.wikipedia.org/wiki/Quantum_computing.
- [18] The "Enigma" machine represented the state of the art of encryption machinery in the 1930s and 1940s, but its ciphertext could be broken on a desktop computer today. See https://en.wikipedia.org/wiki/Enigma_machine.
- [19] I wrote a short program in Python to perform this analysis and plot the histogram. If you want to play with it let me know and I can put the source code on GitHub.
- [20] In the text file used for the ROT13 example, the only bytes counted for the histogram were those in the english alphabet, i.e. the letters A through Z. A single character uses 1 byte for storage. In the encrypted file, all 256 byte values can be used to store each element of the encrypted message, so to produce an accurate frequency histogram all 256 byte values need to be counted. So conceptually the two histograms are comparable, even though the encrypted file histogram has more values being counted.
- [21] I wrote about spread spectrum communications in The Communicator in May 2020. It's available at <https://archive.org/dlarc> or through <https://ve7sar.net>.
- [22] I'll write on numbers stations sometime in the future, but will add here that the Internet has largely taken over as the prime communication channel for espionage. Ciphers and codes, and digital versions of one time pads are still used. The proliferation of open WiFi access points allows field agents to hide their actual locations. Numbers stations persist, however, as they still have utility in developing nations and for some very sensitive intelligence work.

Comprehensive Index to Communicator Articles

Thanks to Blake VA7BWG and Reg VA7ZEB, a database index of Communicator articles back to 2007 is available at [Surrey Radio - Search the Archive](https://www.surreyradio.ca/search-the-archive)





A R | D C

AMATEUR RADIO DIGITAL COMMUNICATIONS

44Net

by KEVIN McQUIGGIN VE7ZD / KN7Q



Kevin VE7ZD/KN7Q is active in EME, meteor scatter and much more. He lives on Vancouver Island.

ARDC (Amateur Radio / Digital Communications) is a registered non-profit organization that seeks to support education, public service, innovation, and research into new technologies in amateur radio, and in relation to digital communications in general.

ARDC is funded through an annuity that is used to fund grants to individuals, amateur radio clubs, experimenters, universities and other groups that seek to advance the state of the radio art. Grants are awarded internationally.

ARDC also manages “44-net”, that portion of the Internet’s IPV4 address space reserved for the exclusive use of amateur radio worldwide.

In mid-December ARDC announced a significant revision of their 44-net services:

The new service offers free Virtual Private Network (VPN) services for amateur radio operators worldwide. While this service has been available for several years, setup was a bit complicated and the average amateur would have had difficulty configuring their VPN client to use the service.

The new service greatly simplifies connection to the 44-net VPN. An amateur radio certification and agreement to the service’s end-user agreement is the only requirement. New users just need to visit <https://portal.ampr.org/> to create a free account. Then visit <https://connect.44net.cloud/dashboard/>, to obtain a private 44.0.0.0 IP address and set up your VPN.

Introducing 44Net Connect: A Simpler Way to Access 44Net

December 10, 2025 | Rebecca Key - KO4KVG

Are you a ham that wants to experiment with 44Net but found the setup process to be intimidating? Say no more, because we’ve got great news for you!

We’re excited to introduce 44Net Connect, a service that makes it easy for hams to begin using 44Net IPV4 addresses through a simple, modern setup. Whether you’re experimenting with digital modes, improving repeater infrastructure, setting up a home lab, or just curious to see what 44Net is all about, this new service lowers the barrier of entry to get you started.



VPNs offer lots of advantages for amateurs:

- A globally-unique, routable IP address on the 44.0.0.0 network;
- The ability to join physically separated 44-net subnets together into a single global network;
- Access to routing functionality that will allow a subnet (group of machines) connected to your router to also obtain 44.0.0.0 IP addresses; and
- The opportunity to experiment with Internet services without needing permission or technical support from your local ISP.

See the two screenshots in this article for further information. This is an excellent (free) service, so you might want to consider it for your shack.

Simple setup: No complex configurations required. Just connect and go!

Get a static IPv4 address: Access a static 44Net IPv4 address without relying on your ISP.

Bypass carrier-grade NAT (CGNAT) limitations: Perfect if your IPv4 support is behind CGNAT or has a short lease from your ISP.

Experiment safely: You can experiment and learn without "breaking the Internet" – 44Net Connect has the bumpers in place for you.

A few technical notes:

You need to download and install the free "WireGuard" VPN client on your desktop, smartphone, router or other device. WireGuard is secure, well-supported, used by hundreds of organizations and is practically an industry standard. Follow the directions in the ARDC portal for download and installation.

I registered at <https://portal.ampr.org>, completed setup and have a VPN tunnel working, which means that I can use the WireGuard VPN client on my machine (my MacBook Pro, but it can be a Windows, Linux, iOS, Android device as well, or an OpenWRT router) to place the machine on the Internet with a 44-net IP address.

When the tunnel is active, the device is connectable/reachable by anyone on the Internet, therefore security is a concern. You need to make sure that your machine's OS and security patches are up to date, and that you have turned on the OS's internal firewall.

A second more advanced mode for the new service is to allow users to create a 44-net subnet (uniquely assigned to them) and then be able to route packets from their subnet to either the Internet or to other 44-net subnets across the world. This would allow all 44-net IP users to communicate, sort of like a private Internet for all hams. Typical uses for this could be linking 44-net mesh or other networks together. This would be a great way link OTCs or communications centres together.

73,

~ Kevin VE7ZD / KN7Q

When Hollywood doesn't do their homework

In Season 2, Episode 2 of *The Last Of Us* ("Through the Valley"), characters several km from town but still in line-of-sight range (except for a few trees) struggle to communicate with the base station in town. What might in reality have been full-quieting exchanges are sometimes barely readable, sometimes buried in the noise. It's surprising that they work as well as they do, since the radios in the field are VHF or UHF handhelds communicating with an HF iCOM IC-765 operating on the phone section of the 20-metre band.

~ Courtesy of the North Shore Amateur Radio Club Newsletter #2552





Digital Library of Amateur Radio and Communications

What's New at DLARC — December 2025

by KAY SAVETZ K6KJN

DLARC has added an enormous trove of publications from AMSAT, the Radio Amateur Satellite Corporation, with the gracious permission of the organization. Formed in 1969, AMSAT designs, builds, launches, and operates satellites carrying amateur radio payloads. In addition to keeping amateur radio in space for 55 years, AMSAT has created a variety of publications, many of which are now in the DLARC library.

DLARC now offers a tantalizingly, nearly complete collection of the [AMSAT Amateur Satellite Report](#) newsletter — from the first issue in February 1981 through issue 193 in 1990. (Only three issues are missing: 147, 189, 190...and any past issue 193 if those were published.)

And! DLARC has added 96 issues the AMSAT Journal, bringing it to 228 issues in the [AMSAT Newsletter and AMSAT Journal](#) collection. Also in that collection are [19 issues of Orbit](#), a glossy magazine sporadically published by AMSAT from 1980 through 1984. Thanks to Paul Stoetzer, N8HM, AMSAT's Executive Vice President, for helping make all of these items available in DLARC.

While we're on the topic of satellite communications, we've added a bunch of historical satcomm material donated by Hank Magnuski KA6M. These [include several drafts](#) [3 links] of the the AMICON System Specification draft ("This is a draft version of specifications for use of the data communications special service channel (L2) on the AMSAT Phase III satellite, the

communications medium which serves as the foundation of the AMSAT International Computer Network (AMICON).") And a [1985 document](#) describing NASA's Advanced Communications Technology Satellite Program (ACTS). And a [AMSAT Orbital Prediction Program](#) in BASIC and Pascal programming languages. There's plenty more satellite communications history in [this amazing collection from KA6M](#).

All at once, the [QSL collection](#) at DLARC has grown from a smattering of cards here and there to an impressive collection of more than 50,000 cards and verifications. It started when the Badger Amateur Radio Society, a student organization at the University of Wisconsin-Madison (W9YT), scanned and [uploaded more than 17,600 QSL cards](#), some apparently going back to the club's founding year of 1930. The collection includes beautiful card designs from all over the world. More details about the digitization and archival project of the BARS QSL cards is at <https://qsla.hadleyso.com>.

Around that same time I heard from the National Radio Club ("the world's oldest and largest medium wave DX Club") which wanted to mirror their collection of QSL cards and verification letters. Ta da, DLARC's new [National Radio Club Verifications](#) collection contains more than 38,000 cards and letters from ham radio stations, mediumwave, and broadcast AM/FM stations worldwide.



Apparently all this effort somehow put the idea of sharing QSL cards into the universe, because Joseph Harris of Columbus, Ohio scanned dozens of his dad’s QSL cards from circa 1955-56, and my buddy Bill Lange started scanning [his dad’s card collection](#). You, too, can scan your (or your family member’s) QSL card collection and share them in the DLARC library. It’s pretty easy, can be done in little batches, and is a great way to preserve your family’s legacy as part of the radio hobby.

I’ve written about our collection of Bexar Wire, the newsletter of the San Antonio Radio Club, before. The club has been around a long time, and club members managed to unearth earlier editions of the newsletter: we were able to scan 144 additional issues of “San Antonio Radio Club Bulletin” and “The Exciter” spanning 1955 through 1978. We’ve also added dozens issues of the [California Historical Radio Club Journal](#) – the issues now span nearly 50 years, 1975 through 2024.

Also we’ve scanned 130 issues of [The Horn Speaker](#), “the newspaper for the hobbyist of vintage sound and electronics” published by Jim Cranshaw N5FSL. It started circa 1969 with the title Antique Radio, and was soon renamed The Horn Speaker with the April 1972 issue. We have sporadic issues from 1973 through 1997. These issues are part of the lot donated to DLARC by the [SPARK Museum of Electrical Invention](#) [in Bellingham, WA].

In a separate Internet Archive project, folks have been working hard to scan issues of [ERIC](#) from microfiche. ERIC is “Educational Resources Information Center”, an online library of education research and information, sponsored by the U.S. Department of Education since 1966. This project has revealed a number of items of interest to ham radio, so I’ve added them to DLARC: including the Newsletter of the Language by Radio Interest Group. (“LBRIG Newsletter consists of news items, short articles, general

information, and opinions on the subject of language learning by radio. Subjects discussed include guidelines for selecting and purchasing shortwave equipment, where to obtain broadcast directories...”) Here’s the [first year](#) of issues and [volume 2](#). Here’s a 200-page document on [Building Telegraphs, Telephones, and Radios](#) for Middle School Children and Their

Parents. Also, here’s a 1986 treatise on [Amateur Radio Satellite Communications](#), and one from 1984 on [Antenna Construction and Propagation of Radio Waves](#).

Next month brings a new year! In 2026, written works published in 1930 will move into the public domain in the United States. Can’t wait to share new old public radio material with you.

Digital Library of Amateur Radio & Communications is funded by a generous grant from Amateur Radio Digital Communications ([ARDC](#)) to create a free digital library for the radio community, researchers, educators, and students. If you have questions about the project or material to contribute, contact me at kay@archive.org.

~ Kay K6KJN

DLARC want list:
<https://archive.org/details/dlarc-wantlist>



Just some of the material available in the DLARC library		
Magazines	Conference Archives	Audio
73 Amateur Radio Today	Comm Academy	Amateur Radio Newslne
Coop’s Satellite Digest	Computer Networking Conf.	California Historical Radio Society News
DXing Horizons	Digital Communications Conf.	Glenn Hauser’s World of Radio
Florida Skip	FOSDEM radio presentations	International Radio Report
Mobile Radio Technology	GRCon GNU Radio Conference	National Radio Club DX Audio Service
Monitoring Times	HamSCI	RAIN Report
NZART Break-In	International EME Conference	<u>Plus</u>
Radio & Television News	MicroHams Digital Conference	Historical callbooks
Radio Craft	Pacificon	40,000+ newsletters
RTTY Journal	QSO Today Virtual Ham Expo	Radio catalogs
Telegraphic Journal and	Software Defined Radio Academy	College radio archives
Electrical Review	...and more	Early Internet ham radio discussions
VHF Communications		Robert B. Cooper’s personal archives
...and many more		



A Special Interest Group for the iCOM 7300, 7610, 9700 and other compatible models

Enhancing Audio Quality and Reception

Techniques and insights



**John Schouten
VE7TI**

Has both an iCOM 7300 and 9700 and is fascinated by the 'hidden' features of these transceivers.

In our world of amateur radio, achieving optimal audio quality and reception is essential for clear communication and enjoyable operation. The Icom IC-7300, IC-7610, IC-9700 and others are highly regarded transceivers equipped with advanced digital signal processing (DSP) and receiver features that allow operators to combat noise, interference, and environmental challenges effectively.

The IC-7300 and the IC-7610 excel in HF/50 MHz operations, while the IC-9700 covers 2m, 70cm and 23cm with a front panel and user interface that is almost identical to that of the IC-7300.

All of these radios offer a compact, user-friendly design. The IC-7610 and the IC-9700 also provide dual receivers for enhanced performance in weak signal or contesting operation.

Understanding how to fine-tune these settings can transform your listening experience, reducing fatigue and improving signal intelligibility without the need for expensive upgrades. By leveraging built-in tools like RF gain, filters, and noise reduction, operators can tailor their setup to urban noise floors or rural quietude, unlocking the full potential of these rigs.

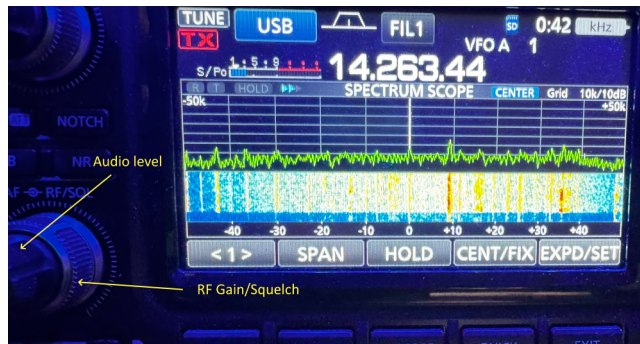
Your speaker

For those who do not use headphones, one fundamental yet often overlooked method for enhancing audio clarity involves speaker placement and sound reflection. Audio from the transceiver's speaker can be directional, and in noisy environments, this can dilute signal comprehension. Positioning a reflective surface, such as a card or book, behind the speaker directs sound waves toward your ears, boosting volume and intelligibility. If you have access to a 3D printer, there are several sound reflectors, many specifically designed for your radio model. This simple acoustic trick works well with both the IC-7300 and IC-7610, complementing their internal audio processing. For the IC-7610, which supports external speakers more readily due to its larger form factor, consider stereo setups to further spatialize sound, but start with basic reflection to appreciate immediate gains in perceived audio quality.

RF gain

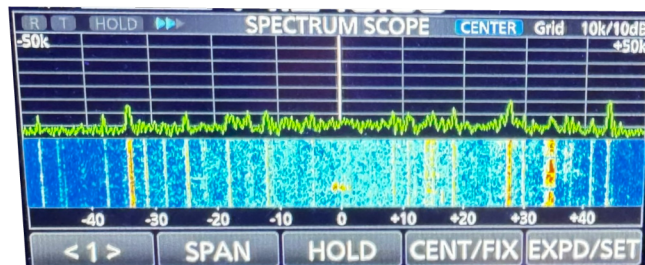
Mastering RF gain control is crucial for both models, as it directly influences the noise floor and signal-to-noise ratio. Contrary to intuition, maxing out RF gain often amplifies background noise, burying weak signals. On the IC-7300, adjust the RF gain via the outer AF RF/SQL knob, rotating counterclockwise to reduce sensitivity until noise just fades while keeping the desired signal audible—this mimics the warm, selective reception of vintage analog radios, and all we've done is reduce the RF gain so the background noise floor is low.

The IC-7610 offers similar control, where minimizing RF gain helps in environments with strong adjacent signals, preventing overload and distortion. Pair this with the IC-7610's IP+ function, which optimizes the analog-to-digital converter for better intermodulation distortion

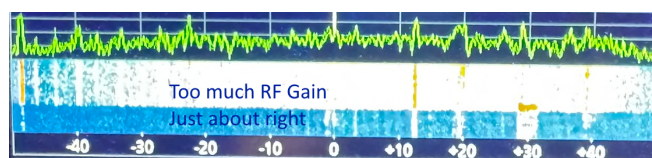


(IMD) rejection when enabled via the function menu, prioritizing IP quality over raw sensitivity for cleaner reception in crowded bands.

In the first example, the RF Gain is set too high resulting in too much noise as seen on the waterfall display.



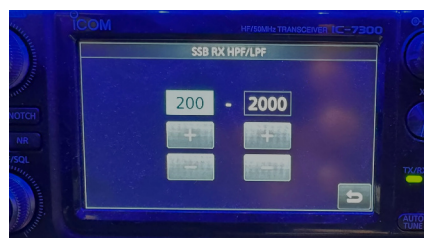
Above the waterfall is much more visible but a lot of noise is still evident. Back off the RF Gain just a bit more.



Here is a photo of the waterfall showing both extremes, with the RF Gain almost fully clockwise (maximum) and the lower portion almost fully counterclockwise (minimum).

Tone controls & settings

Tone controls, bass and treble, provide a powerful way to sculpt audio, focusing on the voice-critical frequency range of 200 Hz to 2 kHz. Both transceivers include bass and treble adjustments accessible through the menu (MENU > SET > Tone Control/TBW > RX), allowing operators to dial in levels from -5 to +5. For the IC-7300, set a high-pass filter (HPF) at 200 Hz to cut low-frequency rumble and a low-pass filter (LPF) at 2 kHz to eliminate hiss, creating a 1.8 kHz passband ideal for SSB voice.



Anything below 200-300 hundred hertz doesn't carry useful information; while anything above

2000 hertz, likewise doesn't carry much intelligibility of use. The receiver conveys a lot of noise in those useless frequencies.

By cutting down the amount of treble above 2 kilohertz, and the amount of bass below 200-300 hundred hertz, then that noise will be reduced. Less noise equals greater intelligibility.

IF filters

Bandwidth and passband tuning serve as precision tools for rejecting interference because it affects your signal-to-noise ratio. The IC-7300 features three selectable IF filters per mode (e.g., FIL1 wide at 3.0 kHz, FIL2 mid at 2.4 kHz, FIL3 narrow at 1.8 kHz), adjustable via the filter icon on the touch screen for widths from 50 Hz to 3.6 kHz in SSB.

Narrowing the bandwidth focuses on the target signal, while the twin passband tuning (PBT) knobs allow shifting the passband to emphasize higher or lower frequencies. The IC-7610 mirrors this with enhanced dual-watch capabilities, where bandwidth limits (e.g., max 2.8 kHz in 5 MHz band for USB modes) ensure compliance while offering sharp or soft filter shapes for noise reduction or audio fidelity.

Press and hold the FIL1, 2, or 3 icon and it will open up a menu where you can change the settings for each filter. If we reduce the bandwidth down to 2.6 kHz or lower, you'll hear very little difference in the quality of the sideband signal, but you will have reduced that high frequency noise. My FIL 2 is at 2.3 KHz and my FIL3 is narrowest at 1.8 KHz. The latter really reduces noise at but loses some audio quality.

Configure all three filters—one narrow for noisy conditions, one wide for clear bands—to switch quickly and adapt to real-time challenges.

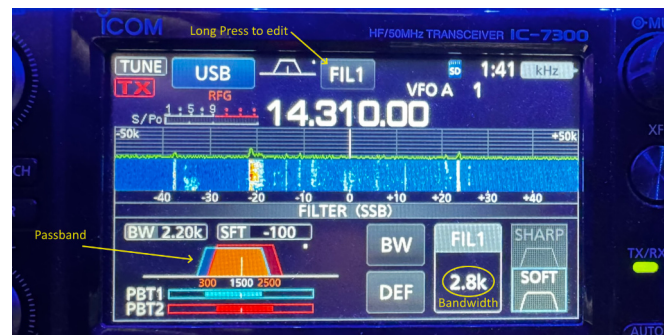
Dual passband tuning

Dual passband tuning adds adaptive control, enabling frequency response shifts for better intelligibility. On both models, rotate the twin PBT controls to move the passband higher (boosting treble for cutting through noise) or lower (for warmer tones). For the IC-7300, this is especially effective in SSB or CW, where shifting toward high frequencies (HF) enhances speech clarity.

If you turn the central control counterclockwise to lower the bandwidth to about 1.6 kHz. You can then rotate the outer control to align the passband, bringing the bandwidth back to 2.8 kHz. This adjustment emphasizes lower frequencies while keeping the bandwidth intact.

If you turn the central control clockwise, you raise the filter to higher frequencies, which reduces the bandwidth again to 1.8 kHz. Adjusting the outer control back to 2.8 kHz favors the upper frequencies, enhancing treble sounds while reducing bass.

You can move the central and outer controls in



opposite directions to narrow the bandwidth further, from 2.8 kHz to 1.6 kHz. This allows you to either adjust the filters together to maintain bandwidth or separately to decrease it.

The IC-7610 benefits from its dual receivers, allowing diversity reception: disable L/R audio mix in the menu (MENU > SET > CONNECTORS > Phones > L/R Mix OFF) and connect separate antennas to compare signals in real-time, significantly improving weak signal pull-out in fading conditions.

Combine this with bandwidth narrowing for targeted optimization, such as in data modes where precision is paramount. DSP noise reduction shines when paired with subtle treble boosts. Both rigs feature adjustable NR levels (0-15 on IC-7300 via holding NR key), which suppress random noise via DSP algorithms.

By leveraging built-in tools like RF gain, filters, and noise reduction, operators can tailor their setup to urban noise floors or rural quietude

Testing on the IC-7300 shows that shifting the IF passband slightly higher (via PBT) before engaging NR allows the DSP to process more effectively, yielding clearer audio despite initial noise increase. The IC-7610's NR, accessible via long press of the NR button for menu adjustments, pairs well with its noise blanker (NB) for pulsed interference elimination.

Enable NB with shallow depth for non-pulse noise and adjust width to match interference patterns, turning urban electrical hum into manageable quiet.

Automatic Gain Control

Automatic Gain Control (AGC) fine-tuning ensures comfortable, consistent audio. Set to slow speeds (e.g., MID 2.0s default in SSB on IC-7300, customizable via FUNCTION > AGC hold) to avoid noise spikes during pauses.

Fast AGC suits rapidly fading signals, but slower settings on both models maintain stability, reducing distraction. The IC-7610's advanced AGC options, tied to its dual receivers, allow per-band customization for smoother operation in diverse scenarios. For a practical demonstration, consider SSB reception on the IC-7300: Select a 2.8 kHz filter, then use PBT to favor the upper passband, boosting treble while attenuating bass. Press the dual knob control to recenter, or shift oppositely to narrow to 1.6 kHz for interference rejection.

On the IC-7610, enable diversity by toggling tracking (MENU > [TRACKING] hold) and compare antennas, then apply NR with a treble shift for enhanced clarity on weak DX signals.

Layer these—RF gain reduction, filter narrowing, and AGC slowdown—for cumulative improvements during contests or noisy operations. Optimizing audio quality and reception on the Icom IC-7300 and IC-7610 is an art blending electronics and experimentation.

From basic speaker tweaks to advanced features like IP+ and diversity reception, these techniques empower operators to conquer noise and elevate performance. Whether chasing rare contacts or casual ragchews, applying RF gain management, tone shaping, DSP noise reduction, and passband tuning will yield exceptional results. Dive into your transceiver's menus, test in real conditions, and discover the clarity these models offer in the ever-evolving ham radio landscape.

You will find several videos on YouTube if you search under your transceiver model and 'noise reduction'. Here is one for the 7300: <https://www.youtube.com/watch?v=OMR2rEiWLIE>

~ John VE7TI



Check out the new [iCOM IC-7300MK2](#) on YouTube and on the back cover. Below, the IC-7300 MkII put through its paces at our OTC by Erika VA7ISI, Michele VE7QMC, Scott VE7KAT.

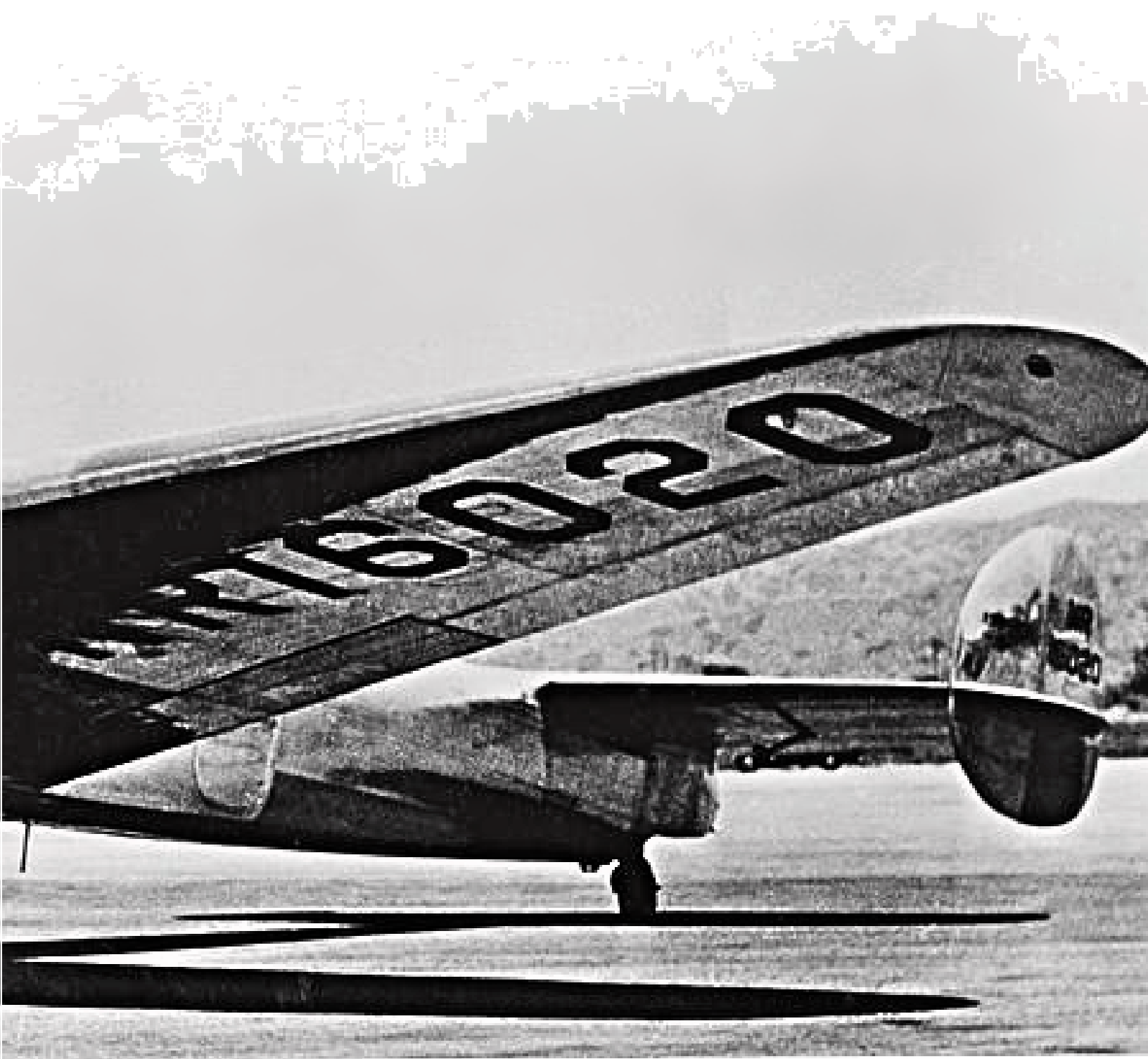




Earhart

Skilled pilot? Poor radio operator?

That Earhart and Noonan failed to reach Howland Island on their 1937 around-the-world flight because of radio problems has been said before — but little has been written about the specifics.^{[1](#)}



Amelia Earhart's final flight, disappearing on July 2nd, 1937, during an ambitious around-the-world attempt, remains one of aviation's greatest mysteries. Recently declassified documents detailing the Earhart-Nonan search, including amateur radio logs, offer new insights into the equipment aboard her Lockheed Electra 10E and the role radio operators played. By examining Fred Noonan's critical part as navigator, clarifying the communication systems, and taking a closer look at the chain of events, we can build a fuller picture of that fateful journey.

Neither Earhart, a pioneering aviator, nor Noonan, an experienced seafarer and aviator were licensed amateur radio operators. She held no communications credentials and focused on flying, not radio, despite her technical interests.

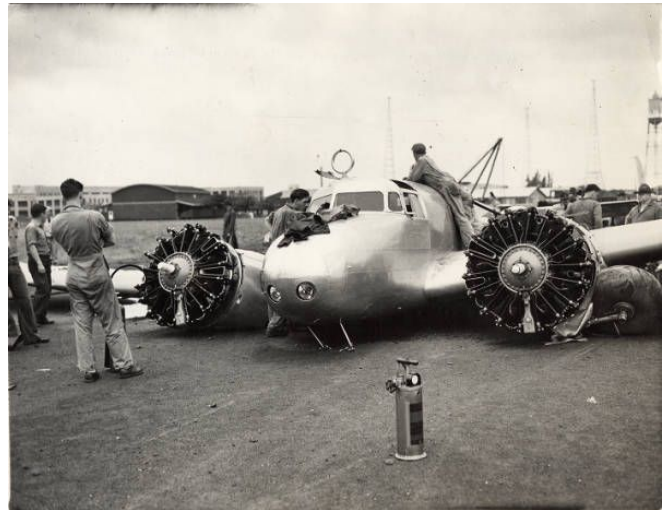
Fred Noonan, her navigator and a former Pan American Airways expert, was the backbone of the flight's precision. A seasoned maritime navigator turned aviator, Noonan had charted early Pacific air routes and mastered celestial navigation using sextants and star observations. He was not Earhart's

copilot—she controlled the aircraft—but his responsibility was to keep them on course. Departing Lae and aiming for tiny Howland Island, a speck in the Pacific, he relied on celestial fixes, headings, and available radio signals. The Electra was operating at the edge of its performance range, and small navigation errors could prove critical. Noonan's logs, later reviewed in official files, showed meticulous planning, but the Pacific offered little margin for miscalculation.

Noonan's job was the charts. Picture him in the Electra's cramped cabin, sextant in hand, timing Polaris or Vega through a small window while Earhart flew the aircraft. His expertise had carried them from Oakland across oceans, stopping in Miami, South America, Africa, India, and Southeast Asia. By their final takeoff from Lae, he had guided more than 20,000 miles with only minor difficulties. Noonan was not the public icon Earhart was—he was the quiet professional tasked with ensuring they found a speck of land in the Pacific on July 2. The flight was a 29,000-mile journey flown east to west—against prevailing winds in many stretches. Refueling stops included Natal, Brazil, and Karachi, India. Noonan excelled in plotting courses through difficult weather and changing conditions. His logs, later examined, showed precise celestial calculations. Rumors that he was impaired by alcohol during the final flight have appeared over the decades, but official investigations do not support the idea; contemporary documentation portrays him as capable but under tremendous pressure.



Her Lockheed Electra, advanced for its time, initially only carried aviation communications equipment by Western Electric, a transmitter and receiver designed for high-frequency bands roughly between 3 and 6 megahertz.



Amelia Earhart's heavily damaged Lockheed Electra 10E special, after a ground loop on near Honolulu

While attempting take-off for Howland Island from Luke Field, near Honolulu, on 20 March 1937, Earhart ground-looped the Electra. A ground-loop occurs when the pilot loses longitudinal control of the aircraft on the ground, usually due to a crosswind, but possibly due to incorrect rudder inputs. The aircraft enters a 360 degree or more rotation on the runway before takeoff or just after landing. Ground-loops usually cause extensive damage to landing gear, the lower part of the fuselage, and potentially the aircraft's propeller or propellers. A ground-loop is classified as a serious pilot error by aviation oversight agencies. The mishap damaged the Electra to the extent that it was shipped back to the Lockheed plant in California for repairs. The radio gear sustained no major damage, but the Western Electric Model 20B radio receiver and its remote-control apparatus were joined by a Bendix aircraft radio receiver and accessories. The stub mast supporting the V-shaped fixed antenna was also moved a bit forward, and the antenna feed line was rerouted.

The experimental model was a continuous-tuning superheterodyne that covered the spectrum from 150 to 10,000 Kcs (KHz), with five bands. It could receive voice, CW, or modulated CW (MCW) signals and could be controlled remotely from the cockpit. A switch permitted the operator to connect the receiver to either the conventional wire antenna or the loop antenna. When the loop was used, the



Western Electric Model 20B
radio receiver



Bendix Type RA-1

combination became an effective radio DF system capable of accurate bearings on frequencies between 150 and approximately 1800 Kcs (KHz). Signals on frequencies higher than 1800 Kcs (KHz). could be heard, but very seldom could accurate bearings be obtained. Earhart was apparently unaware of this.

The Radio System

When the plane left the Lockheed plant, the radio system consisted of the following elements:

- The experimental Bendix aircraft radio receiver
- A prototype of a Bendix Type MN-20 rotatable shielded-loop antenna. It was mounted on the fuselage above the cockpit; the knob that rotated it was on the cockpit overhead between the pilots. It was used primarily for taking radio bearings but was useful as a receiving antenna in static caused by heavy precipitation.
- A Western Electric Model 13-C 50-watt aircraft transmitter with three crystal-controlled channels—500, 3105, and 6210 KHz capable of voice or CW transmissions. It was mounted in the cabin, but there were remote controls in the cockpit.
- Fittings at each side of the cockpit for connecting a microphone, headphones, and telegraph key. A telegraph key and a jack for connecting headphones at the navigator's table
- A 250-foot flexible-wire trailing antenna on an electrically operated, remote-controlled reel at the rear of the plane. The wire exited the lower fuselage through an insulated bushing and had a lead weight, or "fish," at the end to keep it from whipping when deployed. A variable loading coil used in conjunction with this antenna permitted its use on 500 KHz., and the antenna was long enough to give excellent radiation efficiency on all three transmitting frequencies.
- A fixed, Vee-configured wire antenna with its apex at a stub mast mounted on the top of the fuselage, over the center section of the wing, and its two legs

The Lockheed Electra Model 10

is an American twin-engine, all-metal monoplane airliner developed by the Lockheed Aircraft Corporation, which was produced primarily in the 1930s to compete with the Boeing 247 and Douglas DC-2. The type gained considerable fame after being flown by Amelia Earhart and Fred Noonan on their ill-fated around-the-world expedition in 1937

<https://www.usni.org/magazines/naval-history-magazine/1993/december/amelia-didnt-know-radio>

A failure in the plane's antenna system, which made it impossible to receive signals on the fixed antenna, also was a factor. Had she or Noonan known enough about the system to work around the failure, they could have established voice communications, with the Itasca, where someone surely would have suggested they try taking bearings on the vessel's 500-kilocycle beacon. It could have made all the difference.



extending back to the two vertical tail fins. The antenna was so short that its radiation efficiency was extremely low; it was adequate for local communications around an airport when it was not feasible to have the trailing antenna deployed, but not for the long-distance communication Earhart required for her transoceanic flight.

Either wire antenna could be selected from the cockpit. The one selected both transmitted and received by means of a send-receive relay that switched the antenna from the receiver to the transmitter when the microphone button was depressed and switched it back to the receiver when the button was released.² No amateur radio equipment was aboard, and it was entirely aviation-focused rather than for the amateur bands. With radio capability for direction finding, voice and CW, the plane departed Miami on June 1st, 1937, to resume the flight around the world. They made it as far as the Dutch East Indies.

Earhart's radio system transmitted at modest power, and the trailing antenna was sensitive to weather and mechanical issues. Noonan expected to supplement celestial fixes with radio bearings, but clouds often obscured the sky. On July 2nd at 10:22 a.m. with roughly 24 hours of fuel they took off from Lae, New Guinea for the final time. For the leg to Howland Island several US Coast Guard ships were pre-located to act as radio beacons. The U.S. Coast Guard cutter Itasca stood by offshore, prepared to assist with powerful radio transmissions. Earhart's Western Electric set and a direction-finding loop antenna were intended to let her obtain bearings from the Itasca. Noonan calculated the 2,000-nautical-mile leg expecting Itasca's signals to guide them in.



Each ship was to send a separate CW letter to designate their location using accepted aeronautical radio navigation frequencies ideal for use with the direction finder in the Earhart plane. Earhart erred in the mathematical conversion of beacon frequencies to wavelength 7.5 Mc (MHz) instead of the correct 400 Kc (KHz). As a result, the wrong frequencies were conveyed to the ships, especially the Itasca, which was to be the nearest ship to her destination on Howland Island. This grave error resulted in an inability to coordinate their bearings. Despite this, her signals were heard but the ship's radio officers were unable to obtain a fix. The Itasca was putting out strong signals at the time, even San Francisco received them. But the cutter's radio operators strained to guide her with bearings. Her transmitter—primarily used for voice and seldom for Morse—was limited in range. Worse, the frequency that she had designated, 7.50 Mcs was so high that her direction-finder (DF) was inherently incapable of taking bearings on it. The trailing antenna, vulnerable to damage, may not have functioned as expected during the final leg.

After the takeoff from Lae, Earhart and Noonan flew more than seven hours toward Howland. Fuel margins were tight, leaving little time to search. At dawn, Itasca heard, "We are on the line 157-337"—interpreted as a line of position running northeast to southwest. In the area of Howland Island, Earhart transmitted by voice: "Unable to hear you by radio," a sign that her receiver had likely failed. Earhart's last solid transmission, logged by Itasca at 08:43 Howland time, reported that they were flying along a line of position running roughly north-south and that fuel was running low. Noonan likely focused on navigation while Earhart handled radio calls. They believed themselves close but could not see the island. Additional transmissions: "We must be on you but cannot see you" came through faintly, then deteriorated amid static. After this, silence followed. Whether low fuel, atmospheric noise, equipment malfunction, or all the above played a part remains uncertain.

Earhart adjusting the Bendix Type MN-20 atop the additional fuel tanks fitted to the Electra.

Communication remained the linchpin. A contributing factor was surely Earhart's lack of familiarity with her radio gear, especially the selector switch on the receiver between the loop and fixed antennas. Remarkably several transmissions were heard after the Electra must have come down due to lack of fuel. Several stations, notably Midway and Wake Islands, and Honolulu, Hawaii reported hearing 'peculiar' signals, often with a momentary strong carrier but with poor modulation. The signals were like those heard from the Electra in flight but for an absence of engine noise, indicating the aircraft was no longer in flight. It is believed that these originated from the downed aircraft.

No identification of call letters could be made although one seasoned commercial radio operator recorded KHAQQ, which was Earhart's aircraft. Another operator on Wake Island obtained an approximate bearing of 201 degrees but the signal faded before an accurate fix could be made. It is believed that both Earhart and Noonan survived as both were heard, although not clearly. The last of these peculiar signals were monitored at 0948 July 5th, 1937, either because the crew was unable or because the battery was now discharged.

Despite the lack of amateur gear on board, amateur operators listened anyway. Hams, particularly in California and Hawaii, soon began scanning frequencies, claiming faint Morse signals near the region—brief bursts interpreted as distress calls. Declassified reports from 1937 record many such accounts. Operators such as Art Gump in California and Harry Balfour in the Pacific region reported fragmentary Morse signals on frequencies close to Earhart's. Some claimed to hear faint distress calls after July 2. Navy and Coast Guard records document dozens of such claims, and some later speculated that Earhart and Noonan may have landed on Nikumaroro (formerly Gardner Island) and transmitted weak SOS signals. Artifacts found there—including a woman's shoe and aircraft-style Plexiglas—have fueled speculation. However, official reviews concluded that most post-loss radio reports were probably misidentifications, stray signals, or hopeful interpretation rather than confirmed transmissions. Whether any were genuine remains debated.

The U.S. Navy mounted an unprecedented search—nine ships and 66 aircraft covering more than a million square miles. Nothing conclusive was ever found. Noonan's role is highlighted by what might have happened had they sighted Howland: Itasca was producing a large smoke plume for visual reference. Perhaps Noonan miscalculated because of cloud cover, or perhaps Earhart deviated from his advice in hopes of sighting land. Some researchers suggest they flew north searching, while others believe they turned south toward the Phoenix Islands. Documentation provides no definitive answer. After the loss, amateur operators continued listening. One 1937 log from an operator in California recorded a claimed transmission of "fifty miles," but the Navy discounted it. Theories have since proliferated: that Earhart crashed at sea, reached Nikumaroro, or was captured by Japanese forces. Official conclusions lean toward the simplest explanation—unable to locate Howland, the Electra ran out of fuel and was presumably lost at sea. With its additional, but now empty fuel tanks, the aircraft may have floated for a time. If the peculiar signals can be believed, then it is likely the aircraft was on land as the antennas would not have been able to transmit in salt water.

The Electra's limited transmitter and direction-finding equipment failed when needed most, compounded by the frequency errors. The role of amateur radio was more hopeful than decisive, adding to the mystery rather than solving it. Earhart's flight lasted 29 days across 20 stops, ending with two lives lost. Noonan, the skilled but understated navigator, perished with her. He had guided more than 22,000 miles successfully; in the end, even precision was not enough. Noonan's legacy remains that of the navigator who nearly achieved the impossible.

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End-note 1 There is a fascinating account of the Earhart-Noonan journey, a source of inspiration for this article, and a detailed description of their communications issues at <https://www.usni.org/magazines/naval-history-magazine/1993/december/amelia-didnt-know-radio>. It is highly recommended reading.

The Silent Revolution:

The future of RF is in light

by JOHN SCHOUTEN with inspiration from MICHAEL PAPP WB6GJE

For over a century, the amateur radio hobby has been defined by the crackle of analog static, the whine of heterodyne oscillators, and the ever-present battle against interference. Tuning across the bands, a ham's ear is finely attuned to distinguish a weak DX signal from the roar of local noise—be it from a switching power supply, a neighbor's LED light, or the ubiquitous RFI from our digital world. This landscape of electromagnetic chaos is the accepted reality of traditional radio. But on the horizon, emerging from the realms of cutting-edge defense and telecommunications, is a technology that promises to shatter this paradigm: the photonic receiver. This is not merely an incremental improvement; it is a fundamental shift from manipulating electrons to harnessing light, offering a future for amateur radio that is quieter, more sensitive, and radically wideband. Our November guest speaker was Michael Papp WB6GJE. One of Michael's topics was photonic receivers and it opened up a vast library of information that points to a bright future for radio.

The Origin: From Fiber Optics to the Radio Sky

The story of photonic receivers begins not in the ham shack, but in the world of high-speed telecommunications and military-grade electronic warfare. For decades, the limitations of traditional electronics have been apparent to systems engineers. As frequencies climb into the millimeter-wave and microwave regions—essential for 5G, radar, and satellite communications, copper wires and semiconductor components struggle. They suffer from high losses, dispersion, and a fundamental bandwidth bottleneck.

The solution was found in photonics, the science of generating, detecting, and controlling light particles (photons). Optical fibers, which can carry staggering amounts of data over long distances with minimal loss, became the backbone of the global internet. Researchers realized that if they could find a way to "impress" radio frequency (RF) signals onto light waves, they could leverage the immense advantages of photonics for radio reception.

The key breakthrough was the development of high-speed optical modulators and low-noise lasers. In the 1990s and 2000s, agencies like DARPA in the United States heavily invested in photonic systems for radar and signal intelligence. These systems needed to be small, lightweight, and capable of listening across vast swaths of spectrum simultaneously, with less interference than plagues traditional electronic arrays. The photonic receiver was born from this need, a technology that seemed like science fiction just a generation ago.

The Principle: A Symphony of Light and Sound

So, how does a radio receiver that uses light work? The process is elegant, replacing the familiar superheterodyne architecture (with its local oscillators, mixers, and IF stages) with a photonic signal chain.

1. **The Laser Source:** It all begins with a highly stable, low-noise laser that generates a pure, continuous beam of light. This coherent light beam acts as the "carrier" for our RF signal, analogous to the local oscillator in a traditional receiver, but operating at optical frequencies (hundreds of terahertz).
2. **The Electro-Optic Modulator: The Heart of the System:** This is the critical component where the magic happens. The incoming RF signal from the antenna is fed into this device, which also has the laser beam passing through it. The modulator uses a crystalline material whose optical properties change in the presence of an electric field called the Pockels effect. As the voltage of the RF signal fluctuates, it precisely alters the phase or amplitude of the laser beam. In essence, the RF signal is "imprinted" onto the light beam. The pure laser light is transformed into a modulated optical signal that is a perfect analog of the radio waves captured by the antenna. While these sensors are reasonably sensitive, the best conventional radio frequency sensors still outperform Rydberg atom-based sensors with respect to sensitivity. One approach to increase the sensitivity of Rydberg atom-based sensors is to engineer the vapor cell that contains the atomic gas.¹
3. **Optical Processing:** Once the RF signal is encoded onto light, it enters the realm of photonics. It can be sent through long

stretches of optical fiber with negligible loss, allowing the sensitive receiver electronics to be physically separated from the antenna by kilometers, a huge advantage for remote weak-signal stations. Furthermore, optical filters, which are incredibly sharp and selective, can be used to isolate specific frequencies without the phase noise and drift associated with electronic filters.

4. **Photodetection: Light Back to Electricity:** The final step is to convert the processed optical signal back into an electrical signal that we can hear. This is done by a high-speed photodetector, typically a photodiode. The photodiode senses the intensity variations in the modulated light beam and reproduces the original RF signal in electrical form. This "cleaned" and filtered signal is then amplified and sent to a speaker or digital signal processor (DSP) for the operator to enjoy.

This photonic link, from antenna to modulator to photodetector, forms the core of the receiver. Its brilliance lies in its ability to handle an enormous instantaneous bandwidth, from HF all the way up to microwaves, in a single, simple chain and once past the antenna, with a remarkable immunity to the interference that bedevils traditional gear.

The Absence of Interference: The Dawn of a Quieter Hobby

This immunity to interference is arguably the most transformative aspect of photonic receivers for the amateur radio operator. The reasons are fundamental to the physics of the technology.

Immunity to Electromagnetic Interference (EMI): Traditional copper coax and receiver front-ends are excellent antennas. They are susceptible to picking up noise from every nearby source of EMI—power lines, household appliances, and digital devices. In a photonic system, the critical link between the antenna and the processing unit is a beam of light traveling through a glass fiber. Glass is a dielectric; it does not conduct electricity and is completely impervious to EMI. The RF signal, once encoded as light, travels in a hermetically sealed, noise-free environment. The cacophony of the modern RF environment simply cannot couple into the signal path.

Elimination of Intermodulation Distortion (IMD): A major headache for hams, especially during contests or in urban environments, is IMD. Strong

out-of-band signals (like a local AM broadcast station or a nearby FM transmitter) can overload the non-linear semiconductor components in a traditional receiver's front-end, creating "phantom" signals-ghosts and spurious responses—that mask genuine weak stations. Photonic modulators, when designed properly, can exhibit highly linear behavior over a very wide dynamic range. This means they are far less likely to generate these spurious products, resulting in a much cleaner waterfall display and a more intelligible audio passband, even when strong signals are present.

Reduced Phase Noise: The local oscillators in high-quality traditional transceivers are engineering marvels, but they still produce phase noise—a slight jitter in frequency that translates to a "hiss" or "skirts" on either side of a signal, obscuring weak adjacent stations. The lasers used in photonic systems, by their nature, can achieve phenomenal spectral purity and stability, far surpassing what is economically feasible with electronic oscillators. This leads to exceptionally "quiet" reception, allowing operators to resolve signals that were previously buried in the noise floor of their own equipment. For the amateur, this means the possibility of a shack where noise is dramatically lower.

Future Applicability to Amateur Radio: A Glimpse into 2040 and Beyond

While photonic receivers are currently the domain of well-funded labs and specialized military applications, their path to the amateur shack, while long, is illuminated. The key drivers will be miniaturization, integration, and cost reduction, following a trajectory like that of GPS or DSP technology.

1. **The Ultimate Multi-Band, Multi-Mode Transceiver:** Imagine a single, compact transceiver that covers 160 meters through 10 GHz and beyond. A photonic receiver's inherent wideband capability makes this possible. An amateur could work the HF bands in the morning, bounce signals off the moon on 23cm in the afternoon, and experiment with millimeter-wave propagation in the evening, all with the same radio. The traditional concept of "band-specific" radios and amplifiers could become obsolete.

2. **Revolutionizing Antenna Systems:** Photonics enables "radio over fiber." An amateur could install a simple, wideband antenna (like a Discone or active loop) on a tower, with a small, integrated modulator unit. A single, inexpensive fiber-optic cable would then run to the shack, carrying every frequency band simultaneously. This eliminates the need for heavy, lossy coaxial cables, cumbersome antenna tuners, and complex coaxial switching systems. It also allows for the ultimate in remote operation, with the "receiver" physically located hundreds of meters or even kilometers away from any local noise sources.
3. **Advanced Digital Signal Processing (DSP) Integration:** The output of a photonic receiver is a pristine, wideband digital stream. This is a perfect feed for powerful DSP algorithms. Future software-defined radios (SDRs) built on a photonic front-end could run incredibly complex noise-cancellation, signal-separation, and beamforming algorithms on a clean signal that has not been corrupted by the receiver's front-end's own imperfections.
4. **The Challenge of Homebrewing:** The amateur radio spirit has always thrived on homebrewing. The components of a photonic receiver—lasers, modulators, photodiodes—are becoming more accessible. While more delicate than a soldering iron and a handful of transistors, a new generation of "photonics hams" may emerge, building their own optical receivers from kits or surplus components, pushing the boundaries of what is possible from a home station.

The result is an ultimate Software-Defined Radio (SDR) capable of instantly monitoring and processing all amateur bands simultaneously, without the need for multiple switchable bandpass filters and local oscillators that introduce complexity and noise.

A Quieter Frontier Awaits

The journey of the photonic receiver from a classified laboratory to the amateur radio shack will not be swift. Significant challenges in cost, power consumption, and integration for a consumer market remain. However, the fundamental advantages are too profound to

ignore. It represents a paradigm shift as significant as the move from crystal sets to vacuum tubes, or from analog to digital.

It promises a future where noise from analog components that has been the constant companion of every radio operator since Marconi is finally subdued.

For the amateur radio community, a pursuit built on the joy of communication and technical discovery, the advent of photonic reception is not just an upgrade. It is the opening of a new, frontier, waiting to be explored.

~



*This isn't science fiction...
Some early photonic products exist today.
Look at that bandwidth!*

The IC-9700 is a complex rig...

The ICOM IC-9700 is a fantastic tri-band transceiver, offering robust performance across the VHF, UHF, and 1200MHz bands. However, we have received feedback that its extensive feature set can be complex, sometimes leading to confusion that users find difficult to resolve on their own. This has occasionally resulted in owners performing a full reset to return the radio to its default settings and start from scratch. Below, we have outlined some specific instances that have come to our attention. If you have encountered a confusing situation with your own IC-9700, we would like to hear about it; we will address these challenges in future issues to provide clarity for the benefit of all 9700 users.

Here is glitch number one:

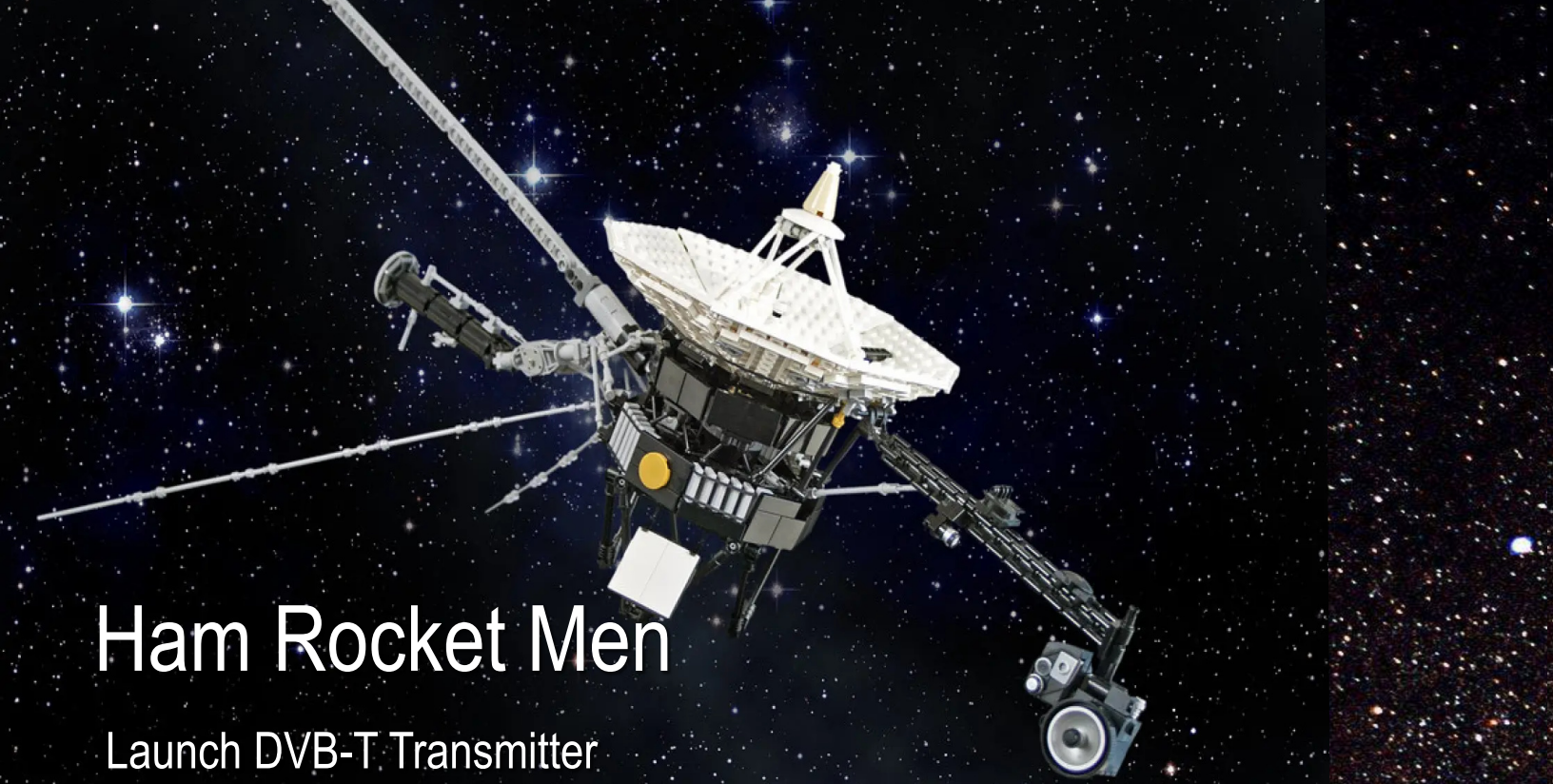
1. If the IC-9700 is operated remotely (over a LAN) via the Icom Remote Utility / RS-BA1 Remote Control software, the transceiver's MOD Input setting gets changed to "LAN", in

which case audio transmission via the hand mike connected to the IC-9700's front panel won't work. For example, you'll find that you can key up a repeater via the hand mike, but other stations listening to that repeater won't hear your audio. I ran into this embarrassing situation during the 7-Oct-2025 SEPAR net. To fix this, change the IC-9700's MOD Input setting back to "MIC, ACC". To do so via the front panel: Menu -> Settings -> Connectors -> MOD Input -> DATA OFF MOD -> MIC, ACC

2. The IC-9700 has a "Monitor" function which can be used to check voice characteristics while adjusting transmit audio parameters. However, if you leave the Monitor function on, you may get feedback during audio transmission. I ran into this embarrassing situation during the 14-Oct-2025 SEPAR net. To fix this, turn the Monitor function off via the front panel: Function -> MONI -> Off.

~ Blake VA7BWG





Ham Rocket Men

Launch DVB-T Transmitter

We have just gotten a report with photos and videos from Ken Goldstein, KD5HEH, in Albuquerque, New Mexico about their recent rocket launch on October 11th. ATVers Ken and Tony KD5CRC, are members of the Albuquerque Rocket Society (www.arsaq.org). Ken said "This was a test flight to see how all of the video equipment worked in an actual test flight."

Ken and Tony had designed a custom DVB-T video transmitter around using a specially modified KH6HTV model 70-9B, 10 watt 70cm amplifier, along with a Hi-Des modulator.

Ken reported major self-made RFI issues with their system. "The video transmit amp had to be set at 3 watts. When I raised it to 10 watts, the entire system stopped transmitting. I had to power the rocket package down and up again. I believe that the RF overloaded the other electronics. Even the VHF radio operated DTMF control board stopped responding with confirmation tones. The video transmits on the UHF band. I need to see if I can resolve this, but worse case we stick with 3 watts. RF

was originally a problem with video cameras even at 3 watts. I tried 4 different cameras. GoPros were the worst when it came to RF causing the camera not to work. I wrapped the least affected camera in RF shielding tape which helped."

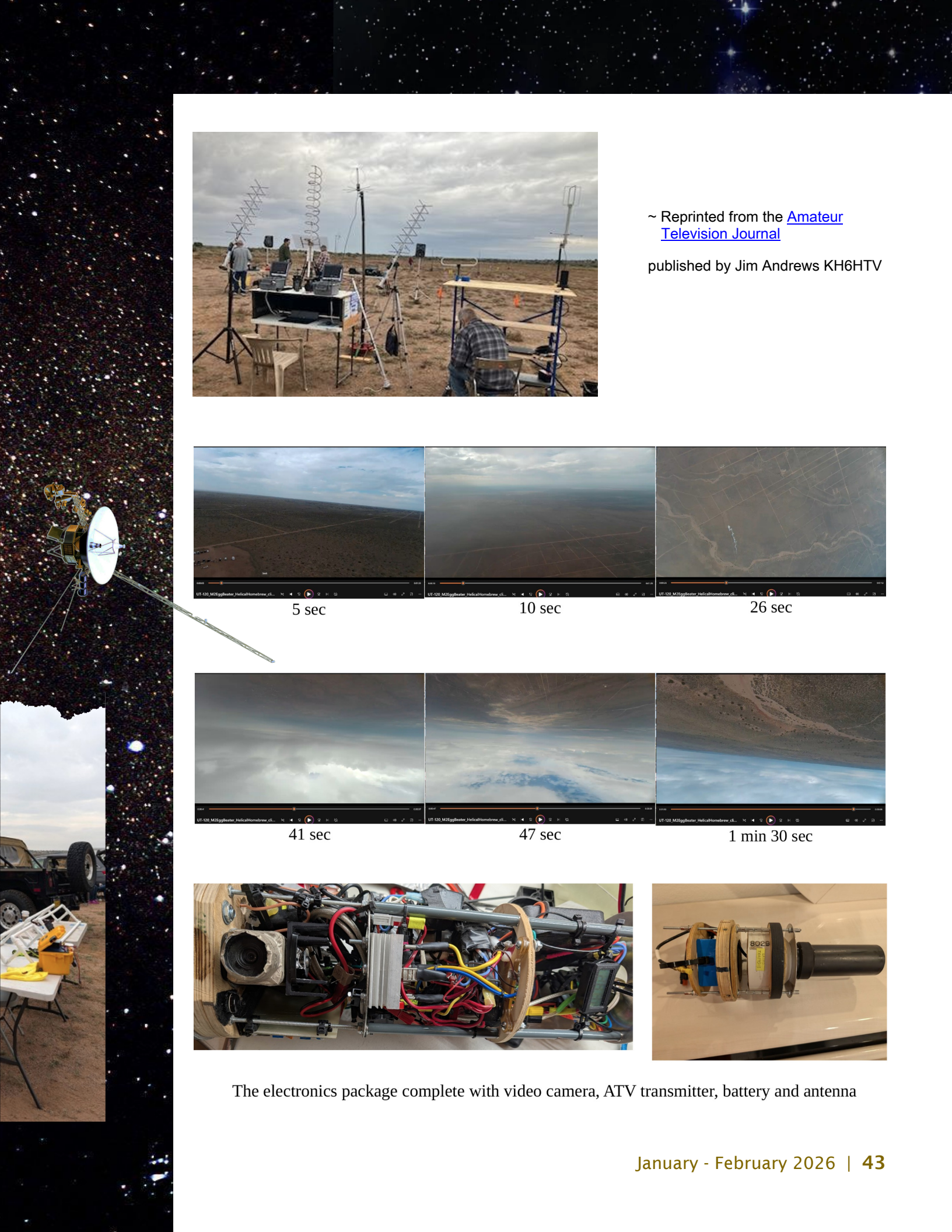
Part of their test was to evaluate various video receiving setups with different receivers and antennas.

What they found worked best was the Hi-Des model UT-120, USB dongle, dual diversity receiver along with two different type antennas on the inputs.

The best antenna combo for the diversity receiver was an M-Squared EggBeater antenna paired with a home-brew Helical antenna. (editor's note: see Amateur Television Journal issue #174, Nov. 2024 for an article entitled "Evaluation of Hi-Des model UT 120 Dual-Diversity, USB, DVB-T, TV Tuner Dongle")

Here are some screen grabs of the UT-120 recorded rocket video for the 1 minute, 38 second flight. Blow them up on your computer monitor to see the full details. It was obviously a very overcast day.

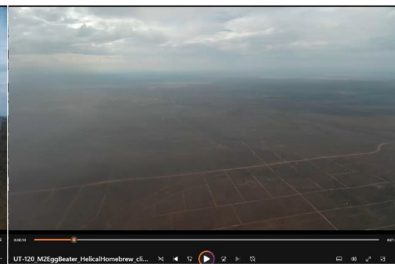




~ Reprinted from the [Amateur Television Journal](#)
published by Jim Andrews KH6HTV



5 sec



10 sec



26 sec



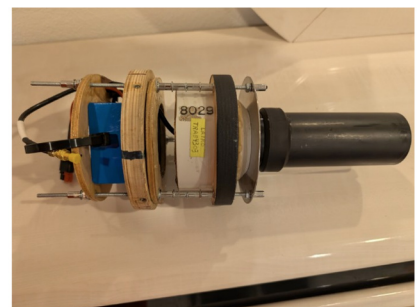
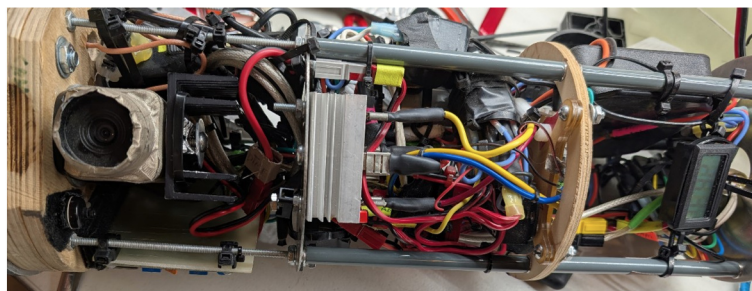
41 sec



47 sec



1 min 30 sec



The electronics package complete with video camera, ATV transmitter, battery and antenna



SALMON
IDAHO



Alan J. Wilson NØXO has been a ham since 1977. In the first decade he was a spotter for the National Weather Service reporting and helping in several tornadic events in the southeast United States.

In the shadow of the Sawtooth Mountains, where the Salmon River carves a relentless path through Idaho's wild heart, the town of Challis clings to the earth like a stubborn root. It is early summer 2026, the kind of season when the air hums with the promise of hay harvests and lazy evenings by the river.

Ellie Hargrove, a rancher in her late fifties, has lived her whole life on the spread just north of town; her days are measured by the bleating of sheep and the steady rush of the Salmon River as it flows toward the distant town of Salmon, sixty miles downstream. Her husband, Tom, died a decade ago, leaving her the ranch, an old ham radio in the barn, and a quiet faith in the land's unyielding rhythm.

That rhythm shatters on a Tuesday afternoon in June. While Ellie mends fence wire, the ground betrays her. A low growl rises from the earth's belly,

then erupts into a violent shudder. The Challis Volcanics—a rugged scar of fault lines and ancient granite formed millions of years ago—unleashes a 7.8-magnitude earthquake, the strongest this century. Chimneys topple in Challis like felled pines, and the ground splits open in jagged cracks, swallowing fence posts and spitting dust. Power lines snap like brittle bones, plunging the valley into a hazy twilight. Cell towers perched on canyon rims crumble under their own weight. In an instant, the modern world flickers out, leaving only the raw pulse of survival.

Ellie stumbles back to the house, hands trembling as she clutches the kitchen table. The quake lasts less than a minute, but it feels eternal, a beast clawing at the foundations of everything. Dust from the shaking coats her throat, and in the distance, she hears the ominous roar of shifting stone. Up the canyon, just north of

the Royal Gorge Resort, a cluster of cabins perched like eagles' nests on the river's edge—a massive rockslide thunders down the slopes. Thousands of tons of basalt and limestone, loosened by the tremor, cascade into the Salmon River, forming an impromptu dam. The water, once a silver ribbon racing toward Salmon, slams against the barrier and halts. It becomes a wall of stone and chaos, forty feet high in places, choked with boulders the size of trucks.

By evening, word spreads on foot and horseback through Challis: the river is stopped. Folks gather at the Round Valley Ranch Store, faces etched with worry. "It's backed up already," says old Harlan, a prospector with a beard like tangled wire. "Gonna flood the town if it holds." Ellie's thoughts turn to the lower pastures where her alfalfa fields lie. She fires up the barn radio generator—a ham setup Tom tinkered with for years—but static hisses back. The quake has knocked out most antennas valley-wide. In Challis, there is one other ham operator, a retired teacher named Walt, but his power supply is fried; wires melted in the surge. Down in Salmon, a handful of hams—maybe three or four—operate on storage batteries charged by solar panels. Their antennas sit on the ground, useless.

The WARC repeaters rundown quickly on battery backup and will last a few hours if not overused. The KL7UT repeater, linked to the Colorado Skywatch Net, is still online; emergency status is declared, and it will carry only emergency traffic for now.

Hams describe what they can see locally and relay it through the Colorado ER net: "Roads impassable in any direction; airport tarmac unusable for fixed-wing aircraft. Challis airfield condition unknown. Send all available evac and medical choppers. Activate National Guard, we need help here! Many injuries; Salmon medical

facilities overwhelmed. SAR needed at Challis and north along Highway 93 towards Salmon. Sheriff's mobile radios are working only car to car in Lemhi County. Reported stoppage of the Salmon River near Ellis flyover—survey needed ASAP." Without proper training, the local hams quickly overwhelm the repeater's reserve power, squandering precious transmit time. By the first night, the repeater is silent.

For the first day, the dam holds like a vengeful god. The river's fury builds behind it, a swelling lake that creeps back toward Challis, swallowing hay meadows and corrals. Ellie's ranch is hit hardest; by dawn on the second day, the water laps at her barn door, turning the earth to muck. She herds the sheep to higher ground, her boots sinking into sodden soil, while the lower farms along the Middle Fork are doomed. Neighbors wade through waist-deep currents to save what they can—tools, saddles, photo albums—but the flood claims tractors and silos, drowning the lifeblood of their livelihoods. "It's like the river's turned against us," Ellie mutters to no one as she watches a neighbor's chicken coop float away like a child's toy boat. News trickles down the canyon on mules, horses, and ATVs, but the roads are nightmares.

The earthquake has scarred the highways with fissures and debris, and aftershocks send fresh rockfalls tumbling into the roads. US-93, the lifeline to Salmon, is blocked in more than a dozen places—a gauntlet of boulders and twisted guardrails. In Salmon, the county seat with its white-steepled church and riverside homes, residents feel the strong quake: a spill of coffee mugs and swinging light fixtures. Mayor Len Slavin calls an emergency meeting at the courthouse, powered by a sputtering diesel generator. "We've got reports of slides up north," she says, her voice steady over the flicker of lantern light. "But no word from Challis. Phones are dead, power's out. Stay

vigilant. Those with undamaged or minimally damaged houses should shelter in place until we get a better assessment. FEMA has been notified, stay calm, help your neighbors. The feds are on their way!" Several voices echo, "Like they did in the North Carolina flood last year?" The mayor turns without comment and walks out.

Without cell service or a local radio station, rumors fester like wounds. Some in Salmon dismiss the warnings as quake jitters; others hunker down in their frame houses along the riverbanks, trusting the familiar bend of the water. "It'll be all right," grumbles Jack Reilly, a mechanic whose garage fronts the Salmon River. He stays put with his wife and two kids, barricading windows against aftershocks, unaware of the monster brewing upstream. Trapped in routine, they light candles and play cards, the river's murmur outside a lullaby turned dirge.

The third and fourth days blur into a tense vigil. FEMA begins to set up a base in Challis and calls the Army Corps of Engineers in to survey the new dam. The new lake stretches eight miles back, a muddy expanse that submerges roads and isolates ranches. Ellie and her neighbors form a ragtag patrol on horseback, ferrying supplies and searching for survivors and the injured. The air reeks of wet earth and decay, and helicopters from Boise cannot reach them—the canyon walls are too sheer, and summer storms turn winds into whipping gales, preventing any high-risk rescues.

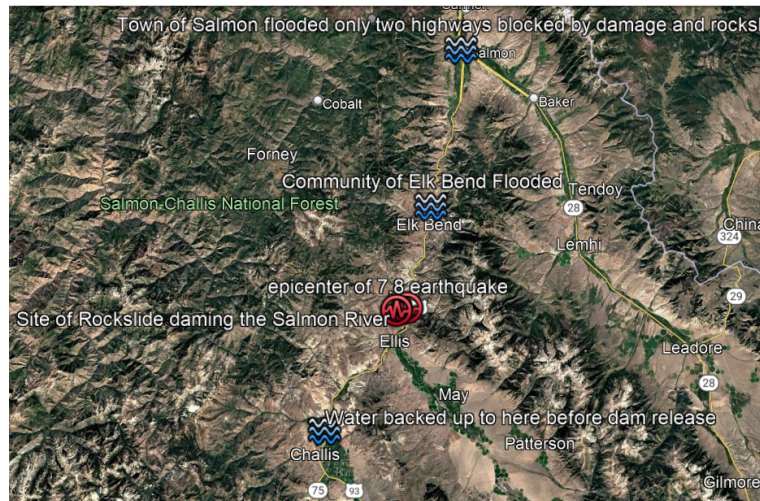
Walt scavenges a car battery to jury-rig his radio, but the signal barely crackles beyond the valley rim. "Salmon hams, this is Challis W7XXX," he broadcasts into the void, voice hoarse. "Dam on the river—flood imminent. Evacuate from the low ground, get to higher ground!" "Static answers. Downstream, the few hams in Salmon tune in sporadically on their

emergency-powered radios with makeshift antennas, catching fragments: "...dam ...flood ...higher ground." But without coordination—no central frequency, no power for repeaters because of overuse and cloudy skies—the messages dissolve

like smoke. There's no radio signal getting over these ridges without repeaters.

Search-and-rescue teams from Idaho Falls are grounded by blocked passes, their trucks idling futilely at checkpoints. Only choppers can ferry people and supplies in and out of the area when the winds die down. The pilot sees the huge rock dam and starts broadcasting on every frequency he can think of: "Dam breach imminent—move everyone to higher ground now!" "On the fifth morning, as the sun crests the peaks, the dam betrays them all.

Ellie stands on a ridge, binoculars pressed to her eyes, when she sees it: a low groan rising from the slide, then a crack like thunder. The wall of rock fractures, boulders tumbling into the roiling pool below. For a heart-stopping moment, the river hesitates—then surges. A wall of water, forty feet high and black with silt, explodes toward Elk Bend, then Salmon, scouring the



canyon clean. It roars through Royal Gorge at sixty mph, uprooting pines and pulverizing the resort's cabins into matchsticks. Within minutes, Elk Bend is swept away in a Salmon River tsunami. The flood hits Salmon like the wrath of the ancients.

Jack Reilly's garage is the first to go, its walls folding like paper as the torrent smashes through. He shoves his family toward the attic, but the river rises too fast, bursting through doors and windows in a froth of foam and debris. "Run to higher ground!" he yells, but it's too late now; the streets are rivers, cars bobbing like corks, sweeping families into the maelstrom. Houses along the banks crumble and float away, foundations eroded in seconds. The old town bridge buckles, spilling vehicles into the abyss. Dozens drown in their homes, clinging to rafters as the water climbs; others perish in traffic jams on the canyon roads, rocks from aftershocks pinning them in twisted metal.

When the roar fades to a sullen churn hours later, Salmon is a ghost of itself. The official count later tallies 127 lives lost, 82 in Salmon alone. Ellie survives; her ranch is half-ruined, but her ridge is spared. She weeps for the neighbors swept away in the backup flood. In the days that follow, National Guard convoys bulldoze paths through the debris, SAR boats pluck survivors from treetops, and investigators begin piecing together what happened. They trace the earthquake's epicenter, the slide's scale, and the five-day reprieve that could have saved most. But the real ghost was the silence.

Ham-radio operators, those unsung sentinels with their antennas and Morse code, were scattered, shocked, without drills, without a plan. "We had the tools," Walt says later, eyes hollow as he repairs his rig under a canvas tent. "Batteries, solar panels, even satellite links if we'd thought ahead. But we were disorganized. No training, just panic."

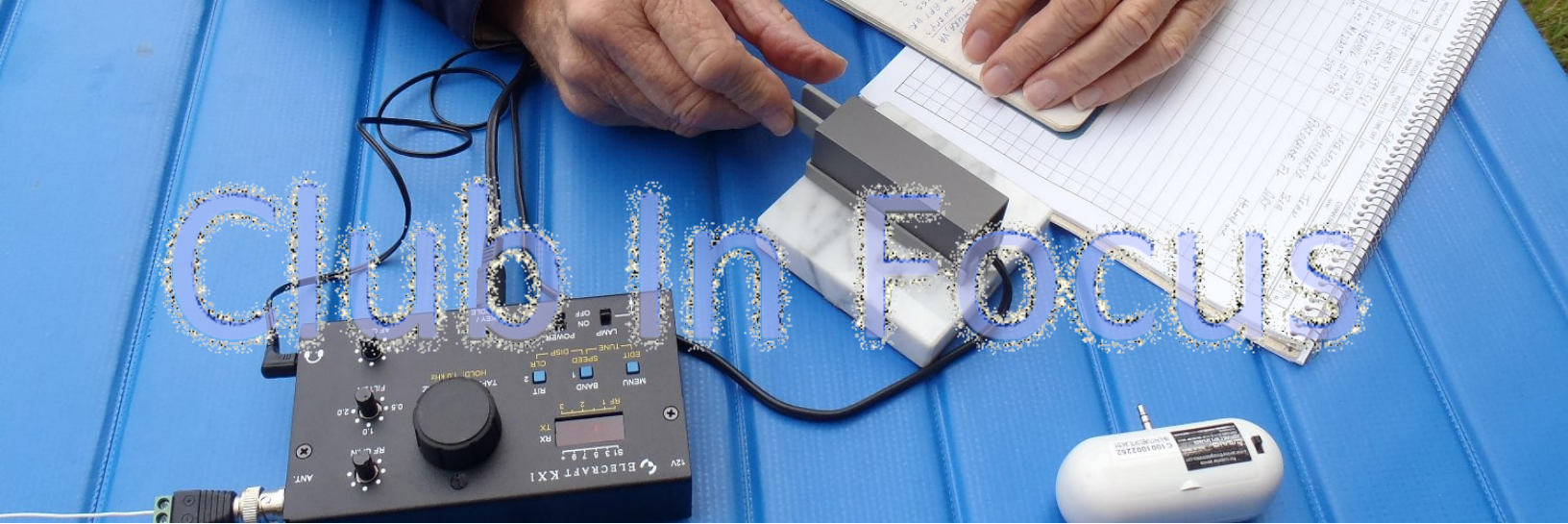
Ellie keeps Tom's radio on the mantel; a relic tuned to the frequency of what-ifs. She decides to get her license like Tom always wanted her to; she vows never to be caught again. The Salmon River runs clearer in time; its banks are rebuilt with riprap and resolve, but the valley carries its scars, the empty chairs at community suppers, the wildflowers blooming over unmarked graves.

In Challis and Salmon, ham clubs sprout like willows after fire, their antennas piercing the sky. They drill weekly, voices linking across the canyons: "This is W7XXX testing one-two. Higher ground, always higher ground. "The river whispers on, indifferent, but the people now listen. Their echoes become a vow against the next time it floods. Ham radio is more than just a hobby; in time of need, it has proved time and time again to be the only link when all else fails. People learned that their smartphones were useless paperweights during such a tragedy. A bittersweet lesson learned by the hams of the Salmon River Valley.

~ Alan J. Wilson NØXO

The story is purely fiction but in fact this valley is set up for this to happen. The places are real. The people some real, some fictional. I wrote this story in hopes of generating some interest in becoming better prepared for any disaster.

I've been a ham since 1977. In the first decade I was a spotter for the National Weather Service reporting and helping in several tornadic events in the southeast United States. We have become over-dependent on our smart phones to provide communications during a disaster. We're setting ourselves up just like in October 2024 in the North Carolina region. We should be prepared for any scenario that may occur. If you wait till it happens, its too late.



Club In Focus

The Canadian International DX Club

by JOHN SCHOUTEN VE7TI

As Editor of The Communicator, I find myself reading many club newsletters, some are OK, some are good and some excellent. It occurred to me that it might be interesting for our readers to experience some of the enjoyment that I have obtained from my armchair links with various groups. So here is another:

In the early 1960's, when I was about twelve, I received an inexpensive and very simple three transistor shortwave receiver kit for Christmas. With this Revell Y-8000, using only a piece of wire as an antenna, I tuned across the dial and discovered quite a number of foreign stations, including several European, Russian, and of course the U.S. Each of them broadcast their version of world news, and some with a fair bit of propaganda thrown in for good measure. It gave me lessons in world history and politics unmatched by other kids my age. I even collected quite a few QSL cards. That early start launched a lifetime of interest in electronics and eventually in Amateur Radio.

Canada's Enduring Voice in Radio Monitoring

Today, in a world where streaming services and podcasts dominate, the experience of tuning into distant radio broadcasts remains a unique pursuit for a dedicated group of enthusiasts. At the center of this global community stands the [Canadian International DX Club](#) (CIDX), a club that has become a cornerstone for those passionate about radio monitoring. Founded in 1962, CIDX describes itself as "Canada's national radio monitoring club"—not an amateur radio group, but a hub for anyone interested in the art of receiving distant radio signals, known as DXing. With over 300

members across Canada, the United States, and beyond, CIDX continues to foster a love for radio in all its forms.

A Legacy Born in the Cold War Airwaves

The story of CIDX begins in the early 1960s, a time when shortwave radio was a primary source for international news and cultural exchange. Established in Winnipeg, MB in 1962, then moving to Edmonton, AB for several years, CIDX finally established their western Canada headquarters in Sherwood Park, AB and the eastern Canada headquarters in Greenfield Park, QC. The club emerged during the Space Age and the Cuban missile crisis, responding to a growing fascination with global broadcasting. Unlike clubs that focused on specific aspects of radio, CIDX adopted a "general coverage" approach, welcoming listeners interested in everything from longwave beacons to satellite uplinks and AM talk shows. This broad mandate helped attract members who saw radio as a way to connect with the world.

As a founding member of the Association of North American Radio Clubs (ANARC), CIDX helped build alliances among clubs, sharing logs, tips, and advocacy efforts. Although ANARC dissolved in 2003, CIDX remains one of its last survivors, standing alongside organizations like the International Radio Club of America (IRCA) and the North American Shortwave Association (NASWA). Its Canadian roots give it a distinct identity, with bilingual verifications from CBC transmitters and logs of Indigenous community radio in the North. President Sheldon Harvey, a long-time leader, emphasizes, "We are not an amateur radio club. We call

ourselves Canada's national radio monitoring club." The club operates from a modest post office box, run entirely by volunteers, with membership dues that have remained unchanged for years.

The Messenger: CIDX's Monthly Newsletter

At the heart of CIDX is The Messenger, a monthly newsletter delivered by email since 2005. This publication is packed with radio news, member contributions, technical advice, and more. Issues often reach 60 to 80 pages, with some editions even longer. The Messenger is free of advertisements, focusing solely on radio content. Each issue begins with reports from club leaders, followed by columns that cover everything from propagation forecasts to equipment reviews. For newcomers, there are guides to help demystify software-defined radios (SDRs) and antenna adjustments.

The newsletter features a variety of columns: medium-wave DX logs, Canadian radio news, digital mode decoding, and shortwave logbooks. Members share their catches from around the world, including stations like Radio Romania and Clandestine Voice of Tibet. There are also sections on pirate broadcasters, technical talks, and even ham radio contests, despite the club's non-ham focus. The Messenger rounds out each issue with reviews of radio-themed books, podcast recommendations, and space weather updates. Member contributions are highly valued, and anyone can submit logs or articles for inclusion.

Membership and Community

CIDX welcomes radio enthusiasts from around the world, regardless of nationality. Membership dues are affordable—\$10 CAD/USD for one year or \$25 for three years—and have remained stable for a long time. Payments can be made via PayPal or cheque. The club's 300+ members include Canadians, Americans, Europeans, and Australians, creating a diverse and intimate community. Monthly virtual meetings on Zoom allow members to share experiences, discuss technical issues, and learn from each other. The club also maintains active online groups on Facebook and Groups.io, where both members and non-members can participate in discussions and share logs.

On the Air and Beyond

CIDX's activities extend beyond newsletters and online forums. President Sheldon Harvey and Gilles Letourneau host 'The International Radio Report', a

weekly show on [CKUT-FM](#) in Montreal, covering broadcast news and trends since 1987. The club also operates special event stations for amateur radio operators during anniversaries and events. CIDX's website and newsletters link to related organizations and resources, supporting a broad network of radio enthusiasts. The club's "Focus on Ukraine" page curates radio links related to the ongoing conflict, highlighting radio's role in times of crisis.

Harvey's Radio H.F. Internet [Newsletter](#), published from 1999 through 2022, was sent monthly to over 1,500 recipients. It curated dozens of vetted sites on radio history, space weather, and technology. Members submitted content for inclusion. Archives are available online. CIDX's web presence connects members to other clubs and resources, including international partners and ham radio organizations.

Why CIDX Endures

In 2025, as technology continues to evolve, CIDX stands as a reminder that radio's appeal lies in the challenge and excitement of discovering distant signals. The club's long history, open membership, and commitment to sharing knowledge have made it a vital part of the radio hobby. Whether you're a dedicated DXer or a casual listener, CIDX offers a welcoming community and a wealth of resources. As President Harvey notes, "We are one of just a small handful of clubs that remain in operation from that organization." With its electronic agility, boundless pages, and open doors for beginners and veterans alike, CIDX proves that the world of radio is still vibrant and accessible.

The Canadian International DX Club continues to thrive by adapting to new technologies while preserving the traditions of radio monitoring. Its inclusive approach, comprehensive newsletter, and active community make it a beacon for radio enthusiasts everywhere. Whether you're interested in shortwave, medium wave, digital modes, or simply the thrill of catching a distant signal, CIDX offers a place to learn, share, and connect. The frequencies are active, and the signals remain discoverable.

73,

~ John VE7TI

Curious? Snag a free sample of their newsletter by emailing sample@cidxclub.ca — a no-strings gateway to the club's ethos. Their FaceBook page is at <http://facebook.com/groups/785651348139814/>

The Challenger+ OCF

A portable Halfwave Antenna by KJ6ER

courtesy of GREG MIHRAN KJ6ER

Many readers will recall the linked 5-band dipole portable antenna project described in the [November-December 2023 Communicator](#). It was a popular project built by over two dozen SARC members and featured accurate matching on all five bands, needing no external tuner.

The KJ6ER Challenger is a resonant one-band-at-a-time elevated antenna but it is an off-center fed (OCF) halfwave vertical antenna. The antenna is tuned for 20m - 6m and mounts on a stable tripod or PVC/spike mount. This OCF antenna requires a short, linked counterpoise wire that helps it complete its halfwave length. This is not a typical multiband EFHW antenna because it is off-center fed and halfwave resonant on each of six bands individually with consistently outstanding measured performance:

- radiation efficiency routinely exceeding 94 %,
- field-measured SWR below 1.10:1 across the phone/CW portions of 20-10m and below 1.20:1 on 6m, and
- a radiation takeoff angle of only 20-21° on the lower bands—approximately 8-10° lower than a typical ground-mounted quarter-wave vertical with four elevated radials.

Performance

This combination translates into real-world on-air advantages of 1 to 2 S-units (6-12 dB) stronger reports on long-haul DX paths compared with classic portable verticals such as the Buddipole, Pac-12, or even many commercial multiband EFHW designs that suffer 1.5-3 dB transformer loss alone on 15 and 10m. 4NEC2 far-field plots for 20m at 14.175 MHz show a maximum gain of -0.7 dBi at 21° elevation with a -3 dB elevation beamwidth spanning from roughly 12° to 32°—ideal for both continental skip and 8,000-12,000 km DX.

The Azimuth pattern is nearly perfectly omnidirectional (± 0.5 dB) with only a gentle 1-2 dB rise toward the counterpoise side, allowing the operator to subtly favor a desired direction simply by orienting the short counterpoise wire. On 10m and 6m the pattern remains clean and low angle, with measured 2:1 SWR bandwidths comfortably exceeding the entire band segments, permitting effortless movement from the CW/digital ends to SSB without retuning.

Hundreds of Parks On The Air (POTA) activations since 2022 have repeatedly demonstrated that a 100 W station using the Challenger can routinely work weak-

signal DX stations that quarter-wave verticals or compromised EFHWs simply cannot hear, while 5-10 W QRP stations regularly complete transcontinental and transoceanic SSB contacts that would otherwise require far more power or larger antennas.

The extraordinary efficiency stems from three deliberate design choices that eliminate the Achilles' heel of nearly every multiband EFHW sold today, the notoriously lossy 49:1 (or 64:1) transformer. Even well-built 49:1 units on FT-240-43 cores typically exhibit 1.2-2.5 dB insertion loss on 15m and higher, equating to 25-40% of your power turned into heat. By contrast, the Challenger uses a simple, low-ratio 4:1 unun—either the inexpensive LDG RU-4:1 (measured -0.34 dB loss → 92.4 % efficiency) or the premium Palomar Engineers Bullet-4:1 (-0.24 dB → 94.6 % efficiency)—combined with an immediate high-attenuation feedline choke (30-38 dB common-mode rejection) that prevents any coax-shield radiation. The result is that virtually all remaining loss occurs only in the short pigtails and whip itself (modeled <0.2 dB), yielding total system efficiency that rivals a center-fed halfwave dipole in free space while maintaining the mechanical simplicity of a vertical.

Ease of construction and deployment are equally remarkable; most experienced hams can assemble a fully functional Challenger in under two hours using parts that are either already in the junk box or easily ordered online for a total new-parts cost of US\$220-300.

Antenna System Parts List with Prices and Links (as of December 2025)

The Challenger OCF halfwave antenna was designed to leverage many components hams typically already have on hand. If not available in your ham radio stuff box, here are some components recommended for the antenna system (substitute as desired). Canadian readers, check [GPS Central](#) for prices:

- Chameleon™ CHA SS25 25' telescoping whip (\$100) for 20M-6M, or alternatively for 17M-6M only: Chameleon™ CHA SS17 17' telescoping whip (\$70) - chameleonantenna.com/products/stainless-steel-whip

- MACTREM™ 67" tripod (\$54) - amazon.com/dp/B0CDKFJLX7
- Pro Trucker™ Mirror mount with 3/8x24 to SO-239 stud, replace SO-239 with a 3/8x24 bolt (\$13) - amazon.com/dp/B01G2QSNDD or alternatively,
- FireStik™ K4 Antenna Sud Mount to be inserted in an existing mirror mount (\$11) - amazon.com/dp/B000X380KQ
- LDG™ 4:1 Unun for the Challenger (\$30) - hamradio.com/detail.cfm?pid=H0-011225 or alternatively, Palomar Engineers™ Bullet higher performance 4:1 Unun for the Challenger+ (\$70) - palomar-engineers.com/antenna-products/Bullet-50-200-4-1-HF-Unun-1-8-61-MHz-100-500-1500-Watts-End-FedOCF-Antennas-p585121030. There is a low cost 5.6m alternative from AliExpress with free shipping for US\$10 - <https://www.aliexpress.com/item/4001007343096.html?mp=1>. I've used it and it is fine.
- Palomar Engineers™ RF Feedline Choke (\$30) for the Challenger - palomar-engineers.com/antennaproducts/Coax-Jumper-Choke-RG-8X-RFI-Range-1-8-65-MHz-30-dB-Noise-Reduction-1-5KW-PEP-Magnetic-Loop-Antenna-Choke-p159344870 or alternatively,
- Palomar Engineers™ low insertion loss RF Feedline Choke (\$70) for the Challenger+ - palomarengineers.com/antenna-products/baluns-and-ununs/1-8-30-mhz-balunsununs/11-toroid-baluns/MINICHOKER-Coax-Line-Isolator-500-Watts-PEP-up-to-38Db-Common-Mode-Rejection-1-61-MHz-1-1-Ununp144638185
- BNTECHGO Yellow 14 AWG radiator pigtail (\$14 for 25' spool) - amazon.com/dp/B06XDL41PS BNTECHGO Orange 18 AWG counterpoise (\$18 for 100' spool) - amazon.com/dp/B01MPZJOYN

The telescoping whip is the primary halfwave radiator screwed into the mirror mount which is attached to the tripod tube. Make sure the whip is isolated from the mirror mount and tripod by using non-conductive nylon washers or gaskets. Additionally, make sure the wire from the unun positive to the base of the whip is also isolated from the mirror mount. The mirror mount is installed for structural purposes only.



A 12" wire (orange 14-gauge) pigtail connects from the bolt at the base of the mirror mount to the unun positive terminal. A 6" wire pigtail (yellow 18-gauge) connects the unun ground terminal to the linked counterpoise wire with a spade connector. This allows quick attachment and extension of the counterpoise band segments. The elevated feedpoint of the unun helps alleviate ground distortion of the resonance and radiation pattern.

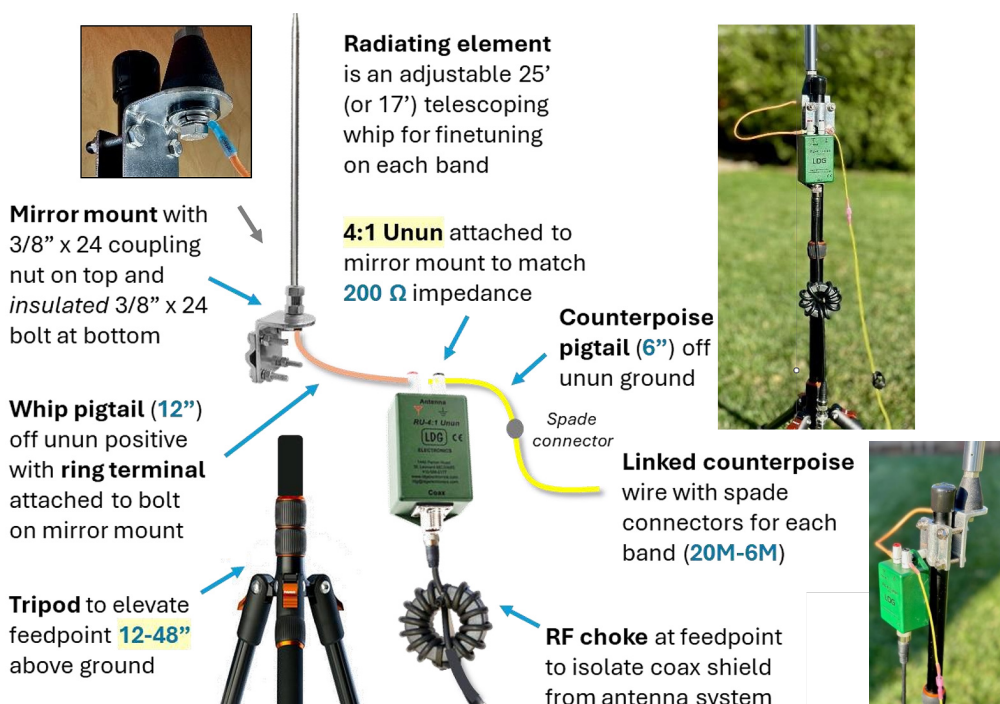
The required RF choke at the unun SO-239 input connector isolates the coax shield from the antenna system preventing it from becoming a second counterpoise. Never use the coax shield as a counterpoise for the Challenger antenna. The linked counterpoise wire off the unun ground terminal should be the only counterpoise used for this antenna because it has been modeled to help the antenna resonate at the center of each band.

As required with a typical off-center fed antenna, the linked counterpoise completes the halfwave antenna, much like radials do for a quarterwave antenna. The counterpoise also ensures a predictable and highly efficient halfwave radiation pattern. For this reason, using the coax shield as the counterpoise is never recommended for this antenna.

The Challenger should always include a high-quality RF choke at the feedpoint to prevent the coax from becoming a second counterpoise which would yield unpredictable results.

The mechanical heart of the system used by Greg is a common heavy-duty photographer tripod (the MACTREM 67 in model is ideal because it has no center brace, allowing an ultra-wide 100° leg spread for rock-solid stability even with the 25 ft whip fully extended in 20 mph gusts). An inexpensive 3/8-24 mirror mount or FireStik K-4 stud is bolted to the tripod's 5/8 inch mast; nylon washers electrically isolate the mount from both the whip base and the 12 in 14 AWG radiator pigtail.

The 4:1 unun is secured to the mirror mount with two of its own mounting bolts plus a short spacer, and the feedline choke screws directly inline—no soldering whatever if you purchase pre-made units. Only four solder joints (or crimp lugs) are required in the entire system: the two pigtails on the unun terminals and the spade/alligator links on the counterpoise segments. The linked counterpoise itself is built in ten minutes: start with a 6 in pigtail off the unun ground lug, then cut and label successive orange 18 AWG segments (69 in for 20 m, additional 63 in for 17 m, etc.) with insulated spade terminals or small alligator clips.



Once cut to the published starting lengths, these segments are never changed again; band changes require only clipping on the next segment and extending the telescoping whip to the approximate marked position. Many builders simply wrap a strip of colored electrical tape around the whip at each band's optimum extension—keeping in mind varying terrain characteristics and ground type, deployment can become a 90-second process: spread tripod legs, screw in whip, clip on counterpoise segments for the desired band, connect coax, done.

Telescoping Whip Radiator and Counterpoise Lengths

To allow the antenna to resonate as a halfwave on 6 bands, one-band-at-a-time with the 25' telescoping whip, there is a 12" pigtail off the unun positive terminal connecting it to the base of the whip for 20M-6M. With the addition of the 12" radiator pigtail, the telescoping whip radiator length is also extended one foot longer. The whip pigtail does not carry a lot of current (at this point in the radiator) so the radiation pattern is negligibly impacted. When using the 17' telescoping whip, the 12" pigtail with the whip provides coverage for the 6m-17m bands. Thus, the 25' telescoping whip is primarily required for 20m band coverage only.

In the chart [right], the total radiator length is equal to the 12" whip pigtail off the unun positive terminal plus the adjusted whip length. The whip configuration shows approximately how many sections above the base section are exposed based upon the lengths of the Chameleon™ whips.

For example, to operate on 15m, extend the 25' whip 7 sections from the top. Or if using the 17' whip, extend it 7 sections plus 7" of the next section. These are reasonable radiator lengths to start measuring band SWR. But as mentioned previously, every installation will vary depending on the ground type and near-field surroundings. Use your antenna analyzer in your deployment location to adjust the whip to resonance of the band you would like to operate on. Some operators like to mark their telescoping whips for each band, which is fine, but be advised that what works in your backyard may not work in a different location. Ground conditions and nearfield surroundings always impact antenna impedance and resonance.

The total counterpoise (CP) length is equal to the 6" counterpoise pigtail on the unun ground terminal plus an incremental counterpoise wire segment to tune the counterpoise for that band. The incremental counterpoise segment is attached via spade connector to the previous segment.

The counterpoise wire can drop down from the unun at roughly a 15° to 30° angle and then run along the ground perpendicular to the telescoping

Band	Target Freq. (MHz)	Radiator					Counterpoise		
		Whip Pigtail (in)	Whip Length (in)	25' Whip Config.	17' Whip Config.	Total Length (in)	CP Pigtail (in)	CP Incr Seg (in)	CP Seg Total (in)
20M	14.250	12	259	11 sec 4"	---	271	---	6	69
17M	18.140	12	196	8 sec 4"	8 sec 12"	208	---	14	63
15M	21.350	12	171	7 sec 0"	7 sec 7"	183	---	5	49
12M	24.940	12	145	5 sec 16"	5 sec 21"	157	---	2	44
10M	28.400	12	120	4 sec 12"	4 sec 16"	132	---	14	42
6M	51.000	12	61	1 sec 16"	1 sec 18"	73	6	22	28

whip. It is always important to keep the counterpoise wire away from the coax feedline, ideally placed on the ground perpendicular to the feedline.

Linked Counterpoise Wire using the LDG™ 4:1 Unun

Through modeling and field experimentation, there are three important keys that make the Challenger a very effective and efficient halfwave antenna in the field:

1. Elevating the transformer and feedpoint off the ground by at least 12" to alleviate ground effects that distort the low angle radiation pattern and potential transmitted energy. This requires a good tripod with a broad leg span to provide physical stability.
2. Inserting an RF choke at the feedpoint to isolate the coax from the antenna system to prevent common mode currents (CMC) and radio frequency interference (RFI). Using the coax as a counterpoise could also lead to unpredictable radiation and SWR.
3. Attaching a linked counterpoise wire which works in conjunction with the telescoping whip for low SWR. Use the whip as your tuning variable, the counterpoise length is constant.

With a typical off-center fed (OCF) halfwave antenna, the sum of the radiator length plus the counterpoise length will always be slightly less than a half wavelength due to the reduced speed of electromagnetic waves in the aluminum radiator and copper wire counterpoise versus free space.

In the case of the Challenger, an average off-center fed percentage of 77% performed best in the field. This is calculated by dividing the

radiator length by the sum of the radiator and counterpoise lengths. On most bands, an average counterpoise length of slightly more than 10% λ performed exceptionally well in conjunction with the telescoping whip for the single band of operation.

If you plan to use the LDG™ 4:1 unun, you should begin by cutting your counterpoise wire segments as shown below. If you use a different unun, the counterpoise lengths could differ. Just like with the PERformer radial lines, a non-conductive segment can be inserted into the counterpoise to effectively terminate the counterpoise wire at that point.

Start with the 6" pigtail and the 6M segment first. When you determine the appropriate length required for resonance on 6M, cut the next 10M segment, and so on. Once you cut these lengths, do not change them. The model has determined that these lengths will resonate at the center of that band. Use the 25' or 17' telescoping whip as your tuning variable in the field for band resonance within the CW/digital or SSB portions of the band.

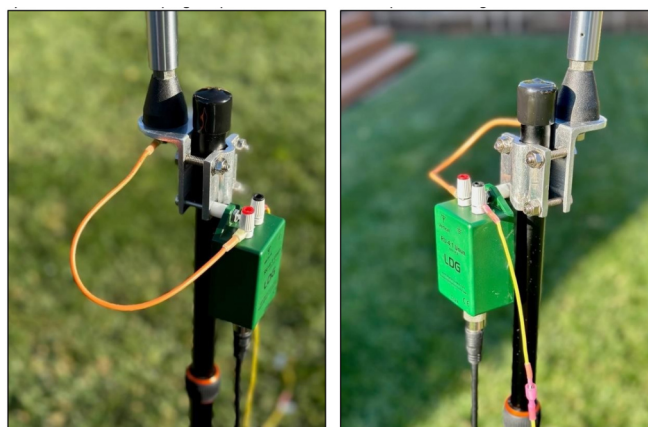


Mounting the Telescoping Whip and Transformer to the Tripod

What makes the Challenger halfwave antenna so easy to pack and deploy is that both the telescoping whip base and the unun are already mounted on the tripod.

Using one of the two lower bolts on the mirror mount, use another long bolt and spacer to keep the unun slightly away from the tripod upper tube. Secure it tightly so that it does not move easily. Keep both the 12" whip pigtail and the 6" counterpoise pigtail attached to the unun.

Once you are in the field, you will just need to extend and spread the tripod legs so that the antenna is physically stable and then easily screw in the telescoping whip and attach the counterpoise wire segment. A very stable tripod



is especially important when using the Chameleon™ 25' telescoping whip due to its longer extension over the 17' whip. It can very easily topple over and damage the whip with unexpected wind gusts.

Spread and extend the tripod legs so that the feedpoint is roughly 2'-4' above ground level. With the MACTREM™ tripod, there is no center plate to limit the leg spread so it can be very stable with a wide span. The legs should be fully extended to 53" each, and the angle between them is approximately 100° (middle position).

In case there is some excessive wind when the whip is extended, securing an 8" garden staple or tent peg on each leg is recommend. Insert these at a perpendicular angle near the base of the leg into the ground.

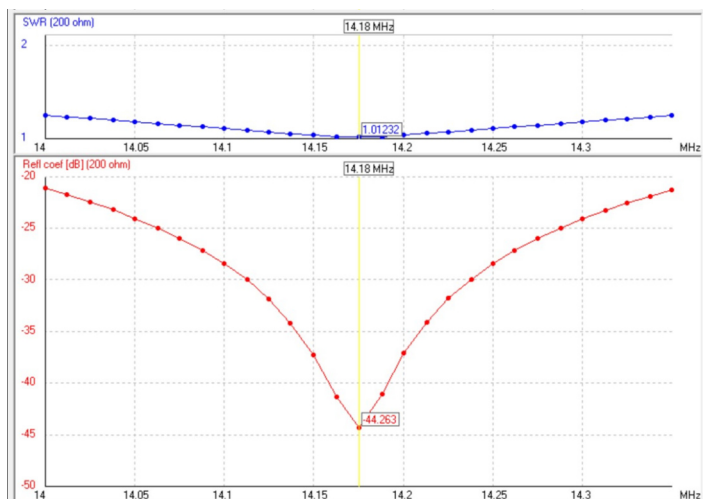
Alternatively, use the built-in hook at the base of the upper tripod telescoping tube with a weight or bungee cord secured to the ground with one of these garden staples or tent pegs. Either way, your tripod will be reasonably secure in windy conditions with a lower center of gravity while only the whip will be waving in the breeze.

Finetuning the Antenna in the Field

You can easily and quickly finetune the Challenger halfwave antenna to resonance with an antenna analyzer by adjusting the length of the whip once the linked counterpoise is laid out on the ground. Since every portable deployment will have different ground types and near-field surroundings, remember generally where to extend the whip initially for a particular band

and then make whip adjustments from there. This is easily done by noting the number of whip sections needed for each band.

In some environments, it may be a challenge to get the SWR you want. Remember, any SWR at or below 1.50:1 is fine - your antenna is 96% efficient at that SWR! But if you are having trouble, try reducing the elevation of the feedpoint by shortening the tripod legs (but avoid getting the feedpoint below 12"). This will not only lower the feedpoint, but it will lay more counterpoise on the ground and may help tune the antenna. This is fine even if the droop angle off the unun ground terminal is under 30°. Because of the resonant bandwidth characteristics of the Challenger, you should not require an external antenna tuner at your rig or at the antenna base, reducing any potential losses caused by these components and saving on packing.

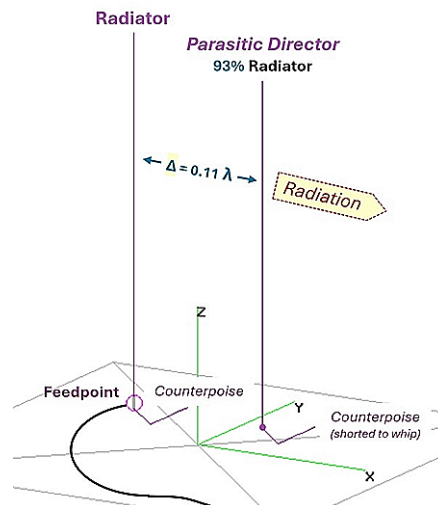


Field SWR Measurements of the Antenna for each Band. The broad bandwidth of the Challenger halfwave antenna allows you to operate across each of the bands without having to adjust the whip while moving to CW or Digital from SSB or vice versa.

The Challenger+

Adding a parasitic director for a 2-element Challenger+ array

The Challenger is a highly efficient antenna system that is ideal for both continental and DX communications across the 20M-6M bands. Adding a parasitic director to the front of the antenna system provides even more gain over a



single Challenger, as well as forward-focused directivity with an excellent front-to-back ratio.

The 2-element parasitic Challenger+ Array uses a single driven element (Challenger with 4:1 unun connected to a feedline) and parasitic element as a director in front (not connected to a feedline or with an unun). Each has its own counterpoise.

The electromagnetic field from the driven Challenger energizes the nearby parasitic element by inducing current within it through mutual coupling which, in turn, reradiates the driven element signal both constructively and destructively forming a unidirectional semi-cardioid radiation pattern. Where constructive, the parasitic element reinforces a portion of the forward driven signal for increased gain. Where destructive, it cancels some of the rear driven signal to create a null forming beneficial directivity and front-to-back characteristics.

After dozens of computer modeling iterations in 4NEC2, an optimal director length (as a % of the radiator) was calculated, as well as the physical spacing between the radiator and the director (relative to the operating wavelength). The model ultimately determined that the director should be 93% of the radiator length and spaced 0.11λ in front of it.

Once deployed in the field, the 2-element parasitic ChallengerArray provides an average of +1.8 dB more gain across the 20M-6M bands with an average 8.4 dB front to back for excellent directivity to a desired geography.

Challenger+ backpack variant

For ultra-portable operation, the “Challenger+” backpack variant is equally straightforward: the same Palomar 4:1 unun and choke are bolted to a 16 in length of 1-1/4 in Schedule-40 PVC pipe capped at both ends. A 3/8-24 coupler nut is epoxied into the top cap accepts the whip; a ground spike or optional miniature tripod slides into the bottom. The entire assembly—whip, PVC mast, unun, choke, and linked counterpoise—fits



in the side pocket of an iCOM IC-705 backpack or any 30 L hiking pack, leaving room for the radio, logbook, and lunch. Total weight is under 5 lb, and field setup on a picnic table or rocky summit requires less than three minutes.

[Above] Short the counterpoise to the whip on the director.

For operators who occasionally desire directional gain, converting the Challenger into a two-element parasitic array is almost trivial: erect a second identical whip and counterpoise 0.11λ (approximately 8 ft on 20 m, 4.5 ft on 12 m, 3.5 ft on 10 m) in front of the driven element, tuned 7 % shorter than the driven radiator (no unun, no feedline, no tuning by whip length only). 4NEC2 and on-air testing confirm an average +1.8 dBi forward gain and 8-10 dB front-to-back across all six bands with no compromise in SWR on the driven element.

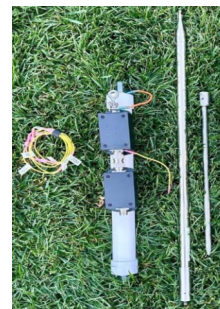
Stowing the second whip alongside the first adds negligible bulk, yet instantly provides a lightweight, no-relay, directional portable beam rivaling much larger and heavier commercial offerings.

Complete dimension tables, 4NEC2 models, photographs, and counterpoise templates are shared freely by the designer, inviting every ham to replicate, experiment, and improve upon this elegant and highly effective design.

Visit [KJ6ER Antennas](http://www.kj6er.com)

The Backpack Portable Version

The iCOM™ backpack side pocket holds the Chameleon™ 25' whip and ground spike. I mount the Palomar™ 4:1 unun and choke on a 16" (1-1/4: O.D.) PVC tube which easily slides in the side pocket.



The Challenger+ backpack version is so compact and works so well, I am now using it at picnic table activations, too. As long as the feedpoint is at least 12" off the ground, it performs well in the field.

The Palomar™ 4:1 unun is mounted to the PVC tube with a small spacer and includes a 6" orange whip pigtail to a 3/8"-24 coupler nut on the top cap. The Palomar™ choke attaches securely to the unun with a PL-259 barrel connector.



The KJ6ER Challenger avoidance of high-ratio transformer losses, elevation of the feedpoint, and use of a short, linked counterpoise have set a new benchmark for what is possible with a collapsible whip and a camera tripod, making it an ideal choice for both 100 W picnic-table POTA activators and gram-counting SOTA/QRP backpackers alike.

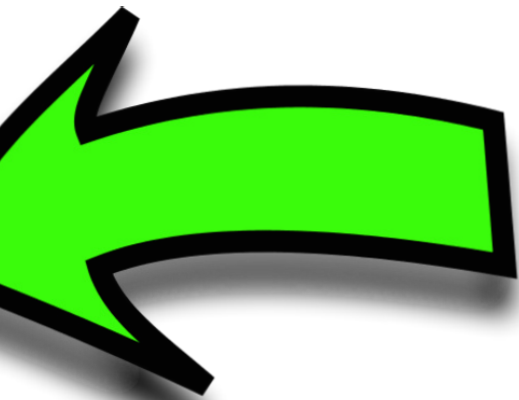
Please let me know if you have any questions, I'd be happy to help, 73!

~ Greg Mihran, KJ6ER

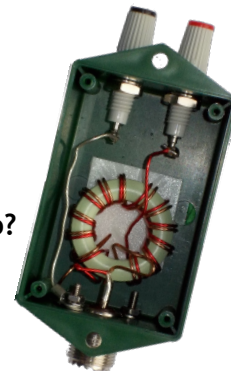
www.qrz.com/db/KJ6ER

greg@kj6er.net

Build your own 4:1 balun? See the YouTube video at <https://www.youtube.com/watch?v=MEiucbV4bIA>



About that Un-un



The [LDG RU-4:1 Un-un](#) is a voltage balun. A 4:1 Un-un is designed to allow your Automatic Antenna Tuner to easily match vertical and end-fed antennas. It can also operate “stand alone”, and may not require a tuner for resonant verticals. It may also be used with any antenna project where a 4:1 Un-un is needed. Connection is by 5-way, twist-on binding posts; connect the red post to the antenna.

Here's a detailed breakdown of why and what that means:

The Name Itself Gives the First Clue: Un-un

1. Balun = Balanced to Unbalanced. Used between a balanced load (like a dipole antenna) and an unbalanced source (like coaxial cable and transceiver).

Un-un = Unbalanced to Unbalanced. Used between two unbalanced systems.

2. A 4:1 Un-un is specifically designed to feed an unbalanced load (like an end-fed half-wave or long wire antenna, or a random wire) from an unbalanced source (your 50-ohm coaxial cable). Its primary job is impedance transformation (4:1 ratio, e.g., 200Ω to 50Ω) while maintaining the unbalanced nature of the system.

The classic current balun uses a coil of coax or bifilar windings on a ferrite core, which presents a high common-mode impedance. This “chokes off” unwanted RF currents on the outside of the coax shield.

3. A 4:1 Un-un uses an autotransformer design (a tapped single winding). This design is inherently better at transforming voltage and impedance but does not provide significant common-mode rejection by itself. It is a voltage-type transformer.

So, What Does a Voltage Balun Do?

Primary Function: Provides impedance transformation (in this case, 4:1).

Secondary Function: It can help decouple the feedline from the antenna to some degree, but its effectiveness at suppressing common-mode currents (the cause of RFI in the shack, coax radiation, and inaccurate SWR readings) is much lower than that of a well-designed current balun (choke).

Key Takeaway and Practical Implication

The RU-4:1 UN-un is perfect for its intended purpose: connecting a 50-ohm coaxial feedline to an end-fed antenna that presents a higher impedance (roughly 2000-5000Ω for a half-wave end-fed, but often tapped or used with a matching network to a lower value). The 4:1 ratio helps match a more reasonable 200-ohm load down to 50Ω.

What it DOESN'T Do Well: It is not the best choice for feeding a balanced antenna like a center-fed dipole. For a dipole, you would want a true Balun (1:1 or 4:1 Current Balun) to prevent the coax shield from becoming part of the antenna and to ensure proper pattern balance.

If you are building a center-fed dipole or any balanced antenna, you should look for a current balun (often labeled as such, or identifiable by its choke/balun design).

If you are setting up an end-fed antenna, a 4:1 Un-un is a very common and appropriate choice for the matching unit at the feed point. For best results with an end-fed, an additional common-mode choke placed a few feet down the coax from the Un-un is often recommended to suppress any remaining RF on the outside of the shield.

~ LDG



Coaxial Cables and Common Mode Currents

by GREGG MESSENGER VE6WO



Gregg Messenger (VE6WO, VE6WGM) was educated as an Electronics Engineering Technologist at the College of New Caledonia in Prince George, BC in the late 90's and became a licensed Amateur in 1998 (VE7WGM). His current interests are studying electro-magnetic field behaviour, spending time on HF making contacts, and checking into regional nets on 40 and 80 meters. Gregg has a YouTube channel at <https://www.youtube.com/@ve6wo>

1. Differential Mode Current in Coaxial Cable

Although coaxial cable is often described as an unbalanced transmission line, that label doesn't really describe what happens to the currents inside it. In practice, *energy in a coax travels almost entirely in the TEM mode, which forces equal and opposite (differential-mode) currents to exist on the center conductor and the inner surface of the shield because of the way a coaxial structure behaves electromagnetically.* The outer surface of the inner conductor carries one component of the differential mode current, while the inner surface of the outer conductor carries an equal magnitude current flowing in the opposite direction.

In the TEM mode these two currents remain equal and opposite at every instant in time. This symmetry is not optional... it is enforced directly by Maxwell's equations and by the boundary condition that the tangential electric field must be zero at the surface of a conductor. As a result, *the coaxial structure primarily supports a well balanced differential-mode current distribution along its inner conductor surfaces.*

2. Mechanism of Common Mode Current Generation

Please refer to figure 1. At the transition between the coaxial line and a balanced antenna element such as a center fed dipole, *the current emerging from the inside of the coax shield (I_s) encounters two electrically distinct paths. These paths behave as parallel impedances: (Z_2) the impedance of the antenna element connected to the shield, and (Z_3) the common-mode impedance associated with the outer surface of the coaxial shield.*

3. The Outer Surface of the Shield as an Independent Conductor

Skin effect isolates the inner and outer shield surfaces at RF, enabling the outer surface to support an independent current mode (common mode) unrelated to the internal TEM mode (differential mode).

4. Interpretation of 'Common Mode' on Coax

In coaxial systems, common mode current refers to current flowing on the outer surface of the shield. This differs from classical two-wire line

terminology, where common-mode currents flow equally and in the same direction on both conductors, so how is it “common” to anything?

5. Existence of a Return Path in All Physical Situations

RF current always completes a closed loop, whether through conduction current in nearby conductive structures or displacement current through the surrounding electric field. Even in free space, where no metallic conductors are present, the electromagnetic field itself provides the necessary return path. For this reason, the term common mode reflects the fact that *the current flowing on the outside surface of the coaxial shield is common to the surrounding environment and that environment serves as its “return conductor”*.

The environment includes such things as ground moisture, the tower, mast, building structures, station equipment, wiring, etc... due to this, common mode current effectively drives all of these objects as unintended extensions of the antenna. It just so happens that I created a video not too long ago that demonstrates in the lab the principles being talked about in this document.



<https://youtu.be/AGYehX1zPN8?si=6g0-47WaXnKNIBD5>

This is the underlying mechanism by which common mode excitation of the coax cable’s outer shield leads to widespread RF coupling problems, such as feedline radiation, increased received noise, RF interference within

equipment, unpredictable detuning, and RF in the shack. In addition, it can cause distortion of antenna radiation patterns, and SWR variability depending on feedline positioning.

7. Suppression Using Chokes (Current Baluns)

A common-mode choke increases the impedance of the outer shield pathway (Z_3), suppressing undesired current from flowing along the outer coax shield while leaving the internal differential mode TEM current unaffected.

8. Fundamental Mechanism Enabling Common Mode Currents

It is this author’s strong observation that *the fundamental mechanism that enables feedpoint driven common mode excitation on the exterior surface of a coaxial shield is the existence of a common mode impedance (Z_3) at the feedpoint*. Electrically, this impedance appears in parallel with the feedpoint impedance of the antenna element connected to the shield.

From the perspective of the inner shield current (I_4), the feedpoint presents two simultaneous pathways: the intended antenna element pathway (Z_2), and the common mode pathway associated with excitation of the outer surface of the coax and its interaction with the surrounding environment (Z_3). Because these impedances form a parallel network, RF current divides between them according to standard current division principles.

Irregardless of how perfectly balanced the dipole’s legs are, any value of common mode impedance less than infinity at the feedpoint (Z_3) will draw a portion of the inner shield current (I_4) resulting in common mode currents on the outside of the coax shield (I_3). Even in a circumstance where the dipole legs are “perfectly balanced”, this parallel impedance structure at the feedpoint will allow common mode currents to form and is the root cause of all feedpoint driven common mode current in coax fed antenna systems.

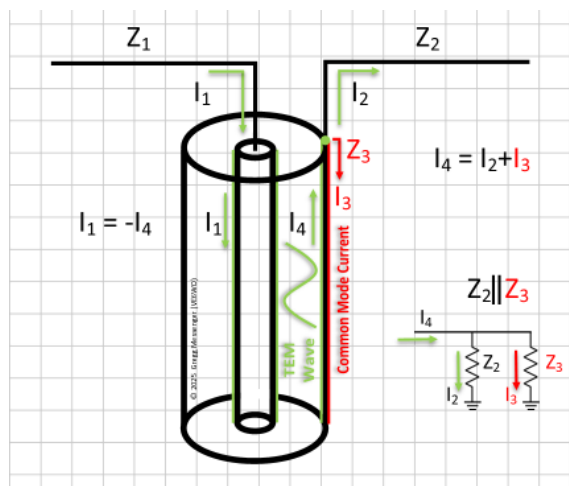


Figure 1. – Current division at the coax-to-antenna transition.

Relationship of common mode current I_3 to the ratio of impedances Z_2 and Z_3 :

$$I_3 = I_4 \cdot \frac{Z_2}{Z_2 + Z_3}$$

If Z_3 is low, I_3 is large → common mode currents are significant.

If Z_3 is large (due to a choke), I_3 is small → common mode currents are minimized.

~ Gregg VE6WO

References

- C.A. Balanis, *Antenna Theory: Analysis and Design*, 3rd Edition. Hoboken, NJ: John Wiley & Sons, 2005.
 - Section 9.7.6 “Baluns and Transformers”, p. 538-539. (Coax unbalance, outer-surface current I_3 , dependence on shield-to-ground impedance Z_g , and suppression of common-mode current.)
 - Figures 9.25-9.26, p. 540-541. (Depicts current flows and how baluns cancel outer-surface current.)
- W.H. “Walt” Maxwell, W2DU, *Reflections III: Transmission Lines, Antennas, and Related Topics*, 3rd Edition. ARRL, 2005.
 - Chapter 21 - “Some Aspects of The Balun Problem”
- Mack, Raymond A., and Jerry Sevick. *Sevick’s Transmission Line Transformers: Theory and Practice*, 5th Edition. SciTech Publishing / IET, Edison, NJ, 2014.
 - Chapter 9 - “Baluns”

Ham ATV Repeaters On the Internet

Want to see what other ATV hams are doing? Then go to your computer and check out:

<https://batc.org.uk/live/>

There are always about 25 ATV repeaters, plus about 1/2 dozen individual hams streaming live video to the BATC server in the U.K. Plus a whole lot more other ATV hams, including our own BATVC, stream occasionally.

For BATVC / W0BTV video steaming, click on either AB0MY or N0YE. BATVC streams our weekly ATV nets, plus any BCARES emergency operations. Granted many of the 24/7 streams are just transmitter site local cameras, test patterns, or repeating slide shows, but

sometimes you will be lucky and find real live video QSOs in progress, or ham club meetings. Here are a random selection of some the videos found recently on the BATC.

Granted many of the 24/7 streams are just transmitter site local cameras, test patterns, or repeating slide shows, but sometimes you will be lucky and find real live video QSOs in progress, or ham club meetings.

~ Jim KH6HTV



Another PERformer Build

Each version seems to get better

by JOHN SCHOUTEN VE7TI



In the last issue of The Communicator, Dmitry VA7DVO wrote [an article about his modifications](#) to Greg Mihran KJ6ER Performer antenna, published in [The Communicator September-October 2025](#).

I 3D printed some of Dmitry's excellent design, specifically the head-end of this award winning antenna. My primary goal was to get away from carrying separate winders for the two radials but I also liked the ability to break it down into manageable sections, the light weight, integration of the feed point, and the easy ability to mount it on the mast.

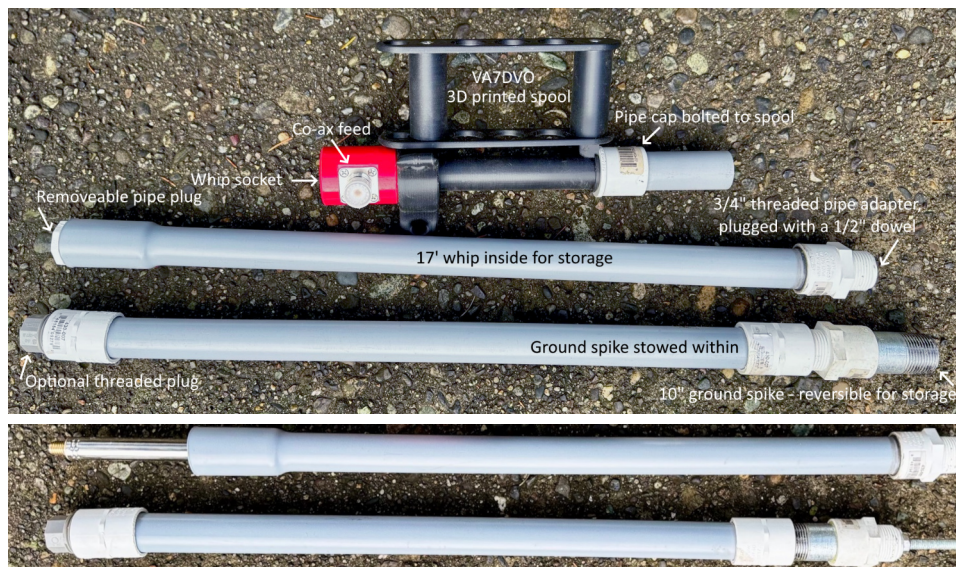
Rather than the aluminium shaft that Dmitry used, I substituted 3/4-inch grey PVC electrical conduit. It is inexpensive, rigid, readily available from home improvement stores and can easily adapt to equally inexpensive off the shelf PVC connectors for either electrical or plumbing use.

Below are photos of my modifications. You can see that I used the flared end of the conduit to slip-connect to the antenna head unit. The other connectors use standard 3/4-inch PVC screw adapters for a very solid unit when assembled. Each of the two conduit sections is about 22-inches long, keeping in mind that the length from ground to the antenna radiator base must be maintained at 52-inches.

I sharpened a point on a length of threaded rod and bolted it with nuts and washers through a PVC threaded adapter. A male dual threaded pipe connector lets me stow it with the point safely inside one tube and I reverse it for operation. The telescopic 17-foot whip also stows nicely inside the other tube protected from damage. While I kept the color intact to illustrate this article, I think that I may paint it for appearance sake.

This great portable antenna is easily transportable, affordable and easy for anyone to build.

~ John VE7TI



Top left: The pieces of the modified PERformer shown with the ground spike and telescopic whip stowed for transport. The radial wires were omitted for clarity but wind around the head end 3D printed spool.

Left are the same two mast sections showing the ground spike reversed and the stowed whip.

Radio Amateurs ^{of}_{du} Canada

2025 Appointment to the Canadian Amateur Radio Hall of Fame

Geoff Smith VA3GS (SK)

by JOHN GROW VE2EQL



Geoff Smith VA3GS (SK)

The Board of Trustees of the Canadian Amateur Radio Hall of Fame is pleased to announce that Geoff Smith, VA3GS (SK), has been named to the Hall of Fame. Radio Amateurs of Canada recognizes deserving Amateurs by appointments to the Canadian Amateur Radio Hall of Fame.

The Constitution for the Hall specifies that the appointment as Member of the Hall is made for “outstanding achievement and excellence of the highest degree, for serious and sustained service to Amateur Radio in Canada, or to Amateur Radio at large”.

The Trustees of the Hall have interpreted the Constitution to mean that the person has performed significant service over many years to enhance the well-being of Amateur Radio.

Born on February 18, 1942, Geoffrey Read Smith was a man of strong values and a lifelong commitment to service – both within his local community and around the world. He believed deeply in the importance of kindness, never letting a day pass without offering an encouraging word, a helping hand, a smile, or a quiet act of goodwill.

Geoff was a Graduate of Mount Allison University in Sackville, New Brunswick. In his professional career, Geoff spent 35 years (1964-1999) at St. Andrew's College in Aurora, Ontario as a Teacher, Housemaster, Counsellor, Coach, Assistant Headmaster, University Advisor, and Cadet Corps Commander. He was also the initiator of Computer Science at the College. He was appointed Headmaster of King's-Edgehill School in Nova Scotia between 1988 and 1990, and after his retirement he spent 12 rewarding years as Principal at Canadian College in Lanciano, Italy.

Geoff passed his Amateur Radio Operator's Qualification in 1977 and was first licensed as VE3KCE, and in 1992 he obtained the call sign VA3GS to go along with his initials. He was a valued and popular member of the York Region Amateur Radio Club (formerly the North York Amateur Radio Club) for over 40 years. He became the club's Chairman of the Board in 1978 and he held several positions between 1978 and 2019 including Membership and Activities Director, Hamfest Director and President. He also involved himself in many of the club's Public Service Events, volunteered at the 2015 Pan Am games and was a member of the York Region Amateur Radio Emergency Service (ARES). He also taught many of the Amateur Radio courses for the club.

Geoff served as the Ontario South Director, Assistant Director and Vice-President of the Canadian Amateur Radio Federation and was the Ontario South Director for Radio Amateurs of Canada from 2004 to 2009. He was also Net Controller on several ONTARS Public Service nets.

From 1982 until he became a Silent Key on December 4, 2019, Geoff was Secretary and co-founder of Coax Publications Inc. and was actively involved as co-author in the preparation, editing and writing of the Canadian Amateur Radio Basic and Advanced Study Guides and in editing the Instructor Guides.

Radio Amateurs of Canada and the Board of Trustees of CARHOF sincerely congratulate Geoff Smith, VA3GS, on his appointment to the Hall of Fame. A detailed account of his achievements will be presented in an upcoming edition of The Canadian Amateur magazine.

For more information on the Canadian Amateur Radio Hall of Fame please visit: <https://wp.rac.ca/carhof/>

~ Prepared by John Grow, VE2EQL
Chair, Board of Trustees
Canadian Amateur Radio Hall of Fame

<https://www.rac.ca/geoff-smith-va3gs-sk-appointed-to-canadian-amateur-radio-hall-of-fame-2025/>

"We are All About Amateur Radio"

Radio Amateurs of Canada (RAC) is the national association for Amateur Radio in Canada. It is a not-for-profit membership association with its headquarters in Ottawa, Ontario, Canada, representing the interests of Amateur Radio across Canada.

Radio Amateurs of Canada represents all Canadian Amateurs at all levels of government. Speaking on behalf of Canadian Radio Amateurs, RAC provides liaison with government agencies and carries the Amateur voice about regulatory and spectrum issues to the discussion table with government and industry leaders, nationally and internationally.

RAC is the Canadian voting member society of the International Amateur Radio Union (IARU).

[The Canadian Amateur \(TCA\) magazine](#),

Canada's national magazine devoted to Amateur Radio, is published six times per year and is available in both print and digital (eTCA) formats as a benefit to RAC members.

For more information please see the detailed text below or download the "[We Are All About Amateur Radio](#)" brochure.

If you have heard enough and are all ready to join us we would love to have you as a member of Canada's national Amateur Radio association! Simply click on the "[Join RAC](#)" link above or on the preceding link.

~



A Starter Guide...

Internet Remote Software Defined Radio (SDR) Receivers

by DAVE GINSBERG N3BKV

What do you do when you are stuck in an apartment, condo or HOA and you want to experience what HF is all about? You can try to hide a wire antenna and use a low cost SDR dongle like the RTL-SDR but your experience is going to be very limited in what you will be able to hear.

The best solution (and it is free as well) is to use a remote internet SDR receiver. Here are a couple of sites you can go to get started:

WebSDR.org: A directory of receivers around the globe, usually accessible with nothing more than a browser. These are often university or club stations that welcome public use.

KiwiSDR Network: Shows active KiwiSDRs on a map. These small receivers are deployed by individuals and groups worldwide and often cover 0-30 MHz.

Let's use KiwiSDR as an example of how to operate a remote SDR. If you go to rx.linkfanel.net on your web browser, you will see a screen like the one below. Listed here all the receivers that are available worldwide as well as an indicator of where the sun is positioned currently for day and night. You can choose from receivers anywhere in the world or just pick one in your area.

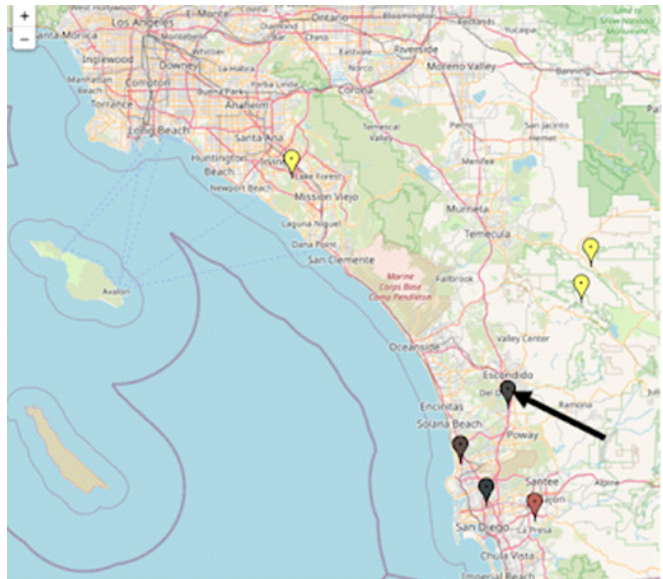
N3BKV's Ham Radio Hacks

Interesting Amateur/Ham Radio projects and reviews

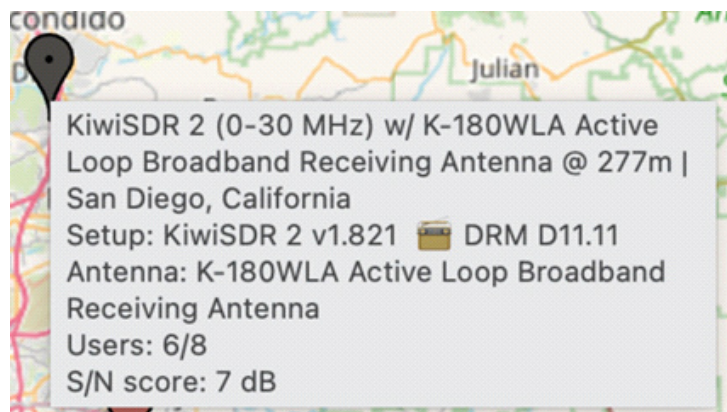
Dave has a blog at <https://hamradiohacks.blogspot.com/> with some very interesting articles that you will likely find of interest.



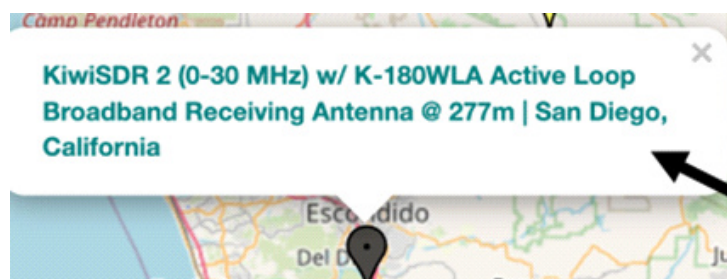
Let's zoom in and look at the receivers in the Southern California area and pick one.



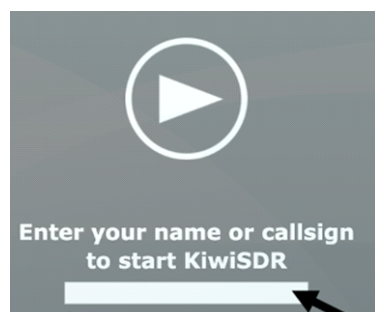
Then you can mouse over it to see how many users it can accommodate, are currently logged in, frequencies available and antennas.



You then click on the receiver info box that comes up on the one that interests you, to connect to it.



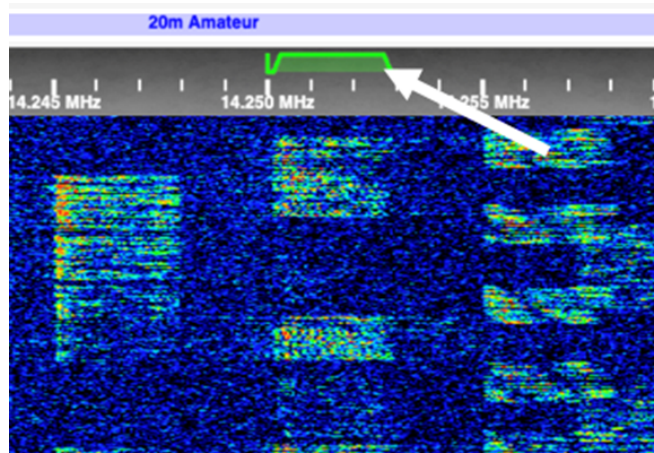
You will next get a screen asking for your name or callsign. Feel free to give it whatever information you feel comfortable sharing.



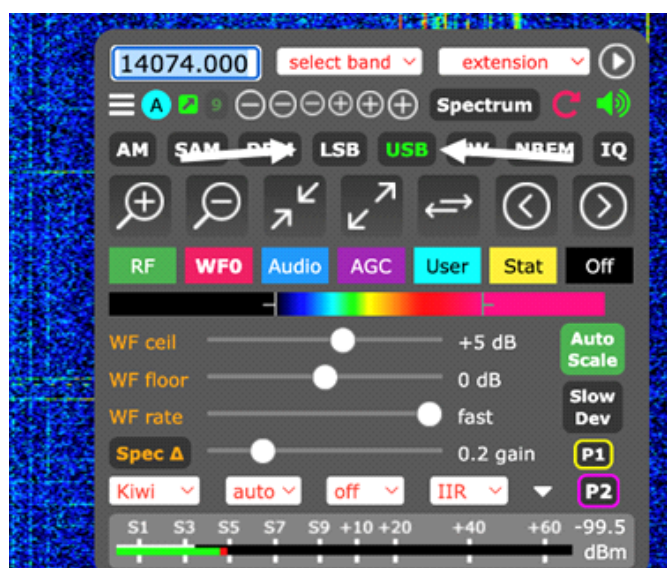
When you hit enter, after you type your name/call the SDR will start up. In the lower right hand corner of your screen, you can select your frequency and mode. I like to hit the + in the circle icon and zoom in to see stations on the waterfall in more detail.



You can then move the tuning cursor on the waterfall by clicking on it with your mouse to tune up and down the band and hear stations.



Remember to change your mode to match the station transmission settings for each band, so if you want to listen to HF voice it is LSB for amateur frequencies below 20 Meters and USB above that.



There is a lot more you can explore with the receivers, but this should get you started. Have fun!

~ Dave N3BKV



The British Columbia QSO Party

by REBECCA KIMOTO VA7BEC

Rebecca Kimoto VA7BEC is the Secretary and contest coordinator for the British Columbia QSO Party, held on the first full weekend of February each year.

Visit ORCA at: <https://www.orcadxcc.org/index.html>

The 2026 running of the British Columbia QSO Party takes place February 7 1600z to February 8 0359z AND February 8 1600z to 2359z. Local time in BC? That's 8am to 8pm on Saturday and 8am to 4pm on Sunday. Participate on one day or both — the choice is up to you.

There are a few points to note for 2026.

1. BC multipliers: Federal electoral districts — NEW map

Canada's federal electoral map was redrawn to reflect changing population numbers across the country, and the new map went into effect with the federal election in April 2025.

BC stations, confirm your federal electoral district here: <https://www.elections.ca/home.aspx>

In the center of the page, you'll see Voter Information Service. Type in your postal code or the postal code of the place closest to where you plan to operate if not at home to confirm your riding. Then find your riding on BCQP multiplier list and use the corresponding three-letter designation in your BCQP exchange.

Logging program writers were contacted and most have updated their BCQP modules. Fully supported programs are N1MM+, N3FJP, CTESTWIN, DXLog, SkookumLogger, SD and TR4W. Please make sure you have the latest version. There are other logging programs that may have QSO party options but if they haven't been configured for BCQP, they may not recognize multipliers specific to BCQP and/or calculate scores correctly.

2. Announced operations

A list of announced operations (BC operators who plan to be on the air) will be posted to the BCQP website a few days before the event. This should raise awareness of activity in BC and help operators near and far find you — point antenna in the right direction for your location in BC — or at least be listening for you.

BC operators, if you plan to be on the air and want to be on this list, contact me by Wednesday, Feb 4 and let me know the callsign you will be using, the mode(s) you plan to work, and the federal electoral district that you will be activating.

3. Rally on 80m, 160m last hour of Saturday segment

The rally draws attention. Here's the schedule:

- 80m CW at 0315z
- 160m CW and SSB at 0330z
- 75m SSB at 0345z

4. Expanded plaque program

The plaque program has expanded, with sponsorship of a new category — Top Young YL. If you know any interested young ladies, in the true meaning of "YL" (say... 19 or younger), please encourage them to get on the air for BCQP 2026.

Rules, tools — including a very handy same-weekend schedule of events and exchanges and a map of federal electoral districts and

British Columbia QSO Party 2026

Feb 7 1600z to Feb 8 0359z **AND** Feb 8 1600z to 2359z



Objectives:

- Stations in British Columbia contact other stations in the province as well as the rest of Canada, the United States and beyond.
- Stations outside British Columbia make contacts with VE7/VA7 stations.

Certificate photo in 2025



Original photo certificates for top scores in all classes of entry in BC in each BC federal electoral district and outside BC in each state, province in the rest of Canada and DX entity. New photo every year! Collectible!

Note: Certificate eligibility requires at least 10 valid QSOs

Plaque photo in 2025



Plaques offered in 12 sponsored categories: Top BC single-op, Top BC multi-op, Top US, Top Canada outside BC, Top YL (Canada), Top YL (US), **Top Young YL (new!)**, Top DX, Top Mixed Mode, Top CW, Most Federal Districts Contacted and Top Club in BC.

BCQP is fully supported by several logging programs, including N1MM+, N3FJP, CTSTWIN, DXLog, SkookumLogger, and TR4W.

Follow links at <http://orcadxcc.org/bcqp.html> for rules, tools, helpful hints, and in-depth event analysis/reports and scores from past years.

BCQP is included in the State QSO Party Challenge.

- Enter competition by posting BCQP score to 3830scores.com

Questions?

Email BCQP Contest Coordinator, Rebecca VA7BEC at va7bec@gmail.com

abbreviations — as well as FAQ, in-depth event analysis/reports and scores from past years... all available for viewing from links on the BCQP page of the Orca DXCC website. Go to <http://www.orcadxcc.org/bcqp.html> and click on the appropriate link.

Good luck and, most importantly, have fun.

73,

~ Rebecca VA7BEC



What really determines the efficiency of an antenna?

Is it Standing Wave Ratio?

by JOHN CORBY VA3KOT



John Corby VA3KOT
resides in Owen Sound,
Ontario but is more often
found operating CW out
in the "Big Blue Sky
Shack". He especially
enjoys activating parks
for the POTA program
and blogging about his
experiences at
[HamRadioOutsidetheBox
.wordpress.com](http://HamRadioOutsidetheBox.wordpress.com)

It is common knowledge that when an antenna has high SWR some of our transmitted power is wasted instead of being transmitted. But is this really true? The trouble with "common knowledge" is that it spreads without further scrutiny. "It must be true because that's what everybody thinks". But let's consider another perspective.

What happens to our signal when it meets an antenna with high SWR? Some of the signal is radiated while the rest is reflected back down the transmission line to its source - the transceiver. What happens to the reflected signal when it reaches the transceiver? It is re-reflected back towards the antenna and the cycle repeats.

So does all the signal eventually get radiated? No. Energy is lost (RED ALERT from the physics department: Energy can neither be created nor destroyed, only converted from one form to another). Ok, my apologies to the physics department, some of the energy is converted to heat as our signal passes along the transmission line and through any ununs, baluns, impedance transformers or other devices en route. Further energy is converted to heat due to the resistance of the wires and the impedance of the transmission line itself.

Thus, on every trip between the transceiver and the antenna, some of our transmitted RF is converted to heat. If the antenna has a high SWR some of our signal travels back and forth between the transceiver and the antenna multiple times and becomes further attenuated on each trip. Therefore, if we can reduce the loss of RF (due to conversion to heat) as



it passes through any devices along the journey between the source (transceiver) and load (antenna) we will improve the efficiency of our antenna system.

How can we do that?

One simple way to achieve that is to correct for the high SWR right at the antenna. A remote tuner can do that. A loading coil will compensate for the high capacitive reactance of a short antenna, but loading coils can be inefficient because of wire resistance. This is especially true in the case of base-loading coils on a quarter-wave vertical antenna. The current is highest at the base of the antenna so more RF energy will be lost to heat ($P=I^2R$) than with a center-loading or top-loading coil.

So the real culprit is not SWR, but the insertion loss of ununs, baluns, impedance transformers, loading coils, transmatches and any other “energy conversion” devices, including the transmission line itself, through which our signal has to pass.

Insertion loss of Ham Radio Outside the Box’s 4:1 ununs

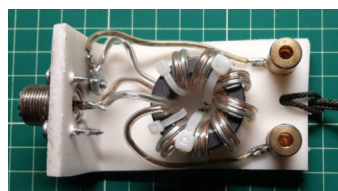
In the previous post I reported on my build of field test versions of a 4:1 unun and a 4:1 balun to compare how each would handle the task assigned to them. Now the job I set myself was to transform what might be called the “Ugly Sisters” builds into something with the good looks of Cinderella. And Cinderella had to be an



QRP 4:1 unun

I built two versions of a 4:1 unun; one for QRP and another for what I like to call QROp. “QROp” is an unofficial label I have adopted to mean about 20 watts or so. Twenty watts will give a 1 S-unit advantage over 5 watts - maybe just enough for our signal to poke its nose above the noise floor when propagation conditions are not so good.

There are 2 main differences between the QRP and the QROp versions: The QRP unun uses a BNC connector and a 4:1 transformer wound on a tiny



QROp unun

FT82-43 toroid. The QROp version uses an SO-239 connector and a 4:1 transformer wound on an FT140-43 toroid.

If we look at the tables below, we can see that the QRP version may have a little too much insertion loss. When we are trying to do as much as we can with as little as possible every milliwatt is wanted. As the wonderful friendly folks on the big Canadian island of Newfoundland like to say: “A little’s a lot if it’s all you’ve got”.

Insertion Loss effects of the Ham Radio Outside the Box QRP unun

Band	QRP (5 watts) UNUN Insertion Loss (dB)	RF Power Lost (watts)	% RF Power Lost
10m	0.39	0.43	8.6
12m	0.37	0.41	8.2
15m	0.35	0.39	7.8
17m	0.34	0.38	7.6
20m	0.33	0.37	7.4
30m	0.32	0.36	7.2
40m	0.35	0.39	7.8
80m	0.73	0.77	15.4

Insertion Loss effects of the Ham Radio Outside the Box QROp unun

Band	QROp (20 watts) UNUN Insertion Loss (dB)	RF Power Lost (watts)	% RF Power Lost
10m	0.24	1.08	5.40
12m	0.23	1.03	5.15
15m	0.22	0.99	4.95
17m	0.21	0.94	4.70
20m	0.20	0.90	4.50
30m	0.20	0.90	4.50
40m	0.20	0.90	4.50
80m	0.22	0.99	4.95

A little extra heat in winter

You would think Canadians wouldn't mind a little extra heat in winter. It's true, but not when the source of that heat is our precious transmitted RF. In case you were wondering, the amount of RF converted to heat by inefficient devices is mostly undetectable. If it can be easily detected the "magic smoke" can't be far behind. When it's 253 Kelvins outside you just ain't gonna notice when the temperature rises to 254 Kelvins (note: the physics department advised me to use Kelvins to avoid confusion between degrees Fahrenheit and degrees Celsius).

Oh no! There's more?

Yes indeed. An unun does not attenuate Common Mode Current (CMC). For that we need a Common Mode Current Choke (CMCC). CMC is the current on the outer surface of a coax braid. Differential mode current is carried on the core and inner surface of the coax braid. Does a CMCC also have insertion loss? Yes, but how much? Let's take a look: *Refer to the tables below.*



QROp CMCC



The (not so) grand total of RF going up the chimney

Band	Total QRP (5W) % RF power lost to heat	Total QROp (20W) % RF power lost to heat
10m	14.2	9.09
12m	13.2	8.75
15m	12.6	8.35
17m	11.8	7.65
20m	11.2	7.00
30m	10.6	6.80
40m	10.0	6.55
80m	18.4	6.80

The white bearded man in the red suit and his flying reindeer might be grateful for a few watts of heat going up the chimney at this time of year, but those of us in the frozen barren tundra of the northern states and provinces, as well as licensed ham dwellers in other cold lands, may not see things the same way.

What can we conclude?

If we only consider the insertion loss - in this example - of the 4:1 voltage unun and the Common Mode Current Choke and ignore resistive losses in the transmission line, and possibly insertion loss in a transmatch ("tuner"), we can determine the potential efficiency of our antenna system.

Insertion Loss of a QRP (5 watts) Common Mode Current Choke (CMCC)

Band	QRP (5 watts) CMCC Insertion Loss (dB)	RF Power Lost (watts)	% RF Power Lost
10m	0.25	0.28	5.6
12m	0.22	0.25	5.0
15m	0.21	0.24	4.8
17m	0.19	0.21	4.2
20m	0.17	0.19	3.8
30m	0.15	0.17	3.4
40m	0.14	0.16	3.2
80m	0.13	0.15	3.0

Insertion Loss of a QROp (20 watts) Common Mode Current Choke (CMCC)

Band	QRP (5 watts) CMCC Insertion Loss (dB)	RF Power Lost (watts)	% RF Power Lost
10m	0.18	0.81	4.05
12m	0.16	0.72	3.60
15m	0.15	0.68	3.40
17m	0.13	0.59	2.95
14m	0.11	0.50	2.50
30m	0.10	0.46	2.30
40m	0.09	0.41	2.05
80m	0.08	0.37	1.85



- For our QRP devices the efficiency varies between 81.6% and 90% across the bands
- For our QRO devices the efficiency varies between 90.9% and 93.5% across the bands

This conclusion is based on the assumption that there is no loss in the antenna itself. We are treating the antenna, the transmission line, unun and CMCC as the “antenna system”. I have made no allowance for SWR losses for the reasons stated in the introduction to this post.

What a load of old codswallop!

I am an expert in the sense that “X” is an unknown quantity and “spurt” is a drip under pressure. I may be completely wrong; I may have fallen off my horse and bumped my head on a rock. I may have come to a fork in the road and

taken it as Yogi Berra once famously said. If you would like to correct me on any wrong assumptions please do so. I receive a lot of direct emails from readers and, while they are most welcome, if you write a comment to this post instead it may trigger an interesting technical discussion here.

A big thank you to all the new and many existing subscribers to Ham Radio Outside the Box. It is people like you who make writing these posts so worthwhile. I appreciate every one of you.

~ John VA3KOT

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The VA7ZEB Line of Sight (LoS) Web App

by REG NATARAJAN VA7ZEB

[VA7ZEB.ca](#) is intended to be a lightweight, fast, no-barriers application that stations can use on the fly in realtime while operating. I don't know what device they may be using or what connectivity they will have, so I insist that it works on phones and on IPv6. I want it to be lightweight and fast, so I don't use most frameworks or libraries which often introduce unwanted weight and complexity. I want it to work offline in the future, so I don't use database software, just JSON objects juggled in memory.

Principles

Basically, this is a graphical display of 360° of the Line of Sight from your location, taking into account your particular location's elevation and optionally, the height of your antenna.

This isn't an RF propagation tool - it's an optical Line of Sight tool to display terrain obstructions / clear paths around your location

Although it's supposed to run on a phone (it runs in the web browser, not on a server), clicking a precise location on a phone or tablet didn't work very well for me. Typing in my street address wasn't found, and it doesn't accept input of a Maidenhead grid square input. It worked great on my laptop where I could more precisely pan around the map, zoom in, and finally click on my exact location.

This web app takes a bit of clicking around to understand, but once you get a few things sorted out, it's pretty cool and potentially useful. For example, it displayed what I'd long suspected (but had never actually bothered to verify) that from my location near Bellingham, Washington, USA I have a mostly clear LOS path to most of metropolitan Vancouver, British Columbia, Canada to my Northwest.

The principles: <https://va7zeb.ca/help/principles/>

Try it out: [VA7ZEB.ca Line of Sight](#)

~ Reg VA7ZEB



Getting Started on 2m SSB

by BOB WITTE KØNR



Bob Witte KØNR
has a great blog
site at [https://
www.k0nr.com/
wordpress/](https://www.k0nr.com/wordpress/)

Bob is author of
VHF, Summits
and More



In the past decade, a new breed of amateur radio transceiver has hit the marketplace – radios that cover from HF through VHF/UHF frequencies. These radios include the ICOM IC-705, the ICOM IC-7100, the Yaesu FTX-1, and the Yaesu FT-991. This is not an exhaustive list since there are new radios being introduced every year with additional capability.

These radios include “all-mode capability” which means that they can operate FM, CW, SSB, and digital on the VHF bands. Clearly, FM is the most commonly used mode on VHF and UHF but having SSB opens up a whole new range of operating fun.

Why SSB?

FM is the most popular mode primarily due to the wide availability of FM repeaters. These repeaters extend the operating range on VHF and enable low-power handheld transceivers to communicate over 100 miles. FM is also used on simplex to make contacts directly without repeaters. The main disadvantage of FM is relatively poor performance when signals are weak, which is where SSB really shines. A weak FM signal can disappear completely into the noise while a comparable SSB signal is still quite readable. How big a difference does this really make? Perhaps 10 dB or more, which corresponds to one or two S-units. Put another way, using SSB instead of FM can be equivalent to having a beam antenna with 10 dB of gain, just by changing modulation types. So this is a big deal, and radio amateurs interested in serious VHF work have naturally chosen SSB as the preferred voice mode. (You will also hear them using Morse code or CW transmissions, which is even more efficient than SSB.)

Just as an example of what is possible on SSB, during one VHF contest, I was operating portable on Garden of the Gods Road in Colorado Springs. I had just dismantled my 2m yagi antenna and was listening to 2m SSB on a



short mobile whip antenna. Suddenly, I heard WA7KYM in Cheyenne, Wyoming calling CQ from about 160 miles away. I figured that with my puny little antenna and only 10 watts of power, there was no way he was going to hear me. But, what the heck, it was a contest, and it would be more points, so I gave him a call. To my surprise, WA7KYM heard me, and we made the contact without much signal strength to spare. Now, to be accurate, this contact has more to do with WA7KYM's "big gun" station (linear amplifier, low noise preamp and large antenna array) than it has to do with my 10 watts and a small whip. The key point is that this contact would not have happened using FM and was only possible because of SSB.

When and Where to Operate

The SSB portion of the band runs from 144.100 MHz to 144.275 MHz and Upper Sideband (USB) is used. The 2M SSB calling frequency is 144.200 MHz, so that is the first place to look for activity or to call CQ. One reality of 2m SSB operation is that many times, no one is on the air. There is just not that much activity out there, compared to 2m FM. Some amateurs get discouraged, turn off the radio and miss the thrill of working distant stations during a band opening. To get started on 2m SSB, the trick is to get on the air at times when you know there will be activity – during VHF nets and contests.

Here in Colorado, the local Rocky Mountain VHF Plus net is on Monday night at 8:00 PM local time on 144.220 MHz (USB). This net is centered in the Denver area but VHF enthusiasts check in from all around Colorado. It is very common to have stations check in from the bordering states of Wyoming, Nebraska, Kansas, New Mexico or even Oklahoma. There is also an informal Beamspinners Net, also entered in Colorado, that happens Monday through Saturday at 8 AM Mountain on 144.200 MHz (USB).

You can find your local 2m SSB nets by searching on the internet, looking for "2m SSB net" and your city or state.

VHF Contests

Think of VHF contests as "VHF activity weekend" since they are a great opportunity to just get on the air and work most of the local 2m SSB enthusiasts. The main contests are the [ARRL June VHF Contest](#), the [ARRL January VHF Contest](#), the [ARRL September VHF Contest](#) and the [CQ Worldwide VHF Contest](#) in July.

For more information, take a look at the article [How to Work a VHF Contest](#).

Equipment

The required equipment to get started on 2m SSB is pretty basic - a transceiver capable of 2m SSB and a 2m antenna. If you own one of the rigs mentioned above then you are probably ready to go. The 2m antenna you already have is probably vertically polarized since that is what we use for 2m FM, both mobile and base stations. All the 1/4-wave and 5/8-wave antennas that are commonly used for 2m mobile work are vertically polarized. Most omni-directional base station antennas such as those made by Cushcraft, Diamond, Comet, etc. are vertical, too. These antennas will work for SSB, but most of the really active 2m SSB stations use horizontally-polarized antennas. Vertically-polarized stations can work horizontally-polarized stations, but there will be a substantial signal loss (about 20dB?). If vertical is all you have, then give it a try. If you can get a horizontal antenna, then your results will be much better.

The most common horizontally-polarized antenna on 2m is a Yagi mounted so that its elements are parallel to the ground. There are a variety of horizontally-polarized, omni-directional mobile antennas, such as the HO antenna made by M2 (see <http://www.m2inc.com>).

Get on the Air

This information is intended to get you started on your way to operating 2m on the SSB portion of the band. You will learn more as you get into it and you will find that most of the people hanging out on sideband are friendly, knowledgeable, and helpful. They are always happy to see new call signs on the band.

Some resources available on the web are:

Rocky Mountain VHF Plus web page: <http://www.rmvhf.org>

VHF Operating articles by KØNR (similar to this one) at: <http://www.k0nr.com/>

North East Weak Signal Group web site at: <http://www.newsvhf.com/>

~ Bob KØNR

KB6NU'S HAM RADIO

Converting the shack computer to Linux WSJT-X

by DAN ROMANCHIK KB6NU



Dan Romanchik

KB6NU blogs about amateur radio at KB6NU.com when he's not trying to figure out which way current flows. Dan teaches ham radio classes, and operates CW on the HF bands. Look for him on 30m, 40m, and 80m. You can email him at cwgeek@kb6nu.com

I'm not a big FT-8 user, but what shack computer would be complete without an installation of WSJT-X? So, last night I installed the program. After selecting the correct audio input, I was seeing and decoding FT-8 signals on 20 meters.

WSJT-X screen shot

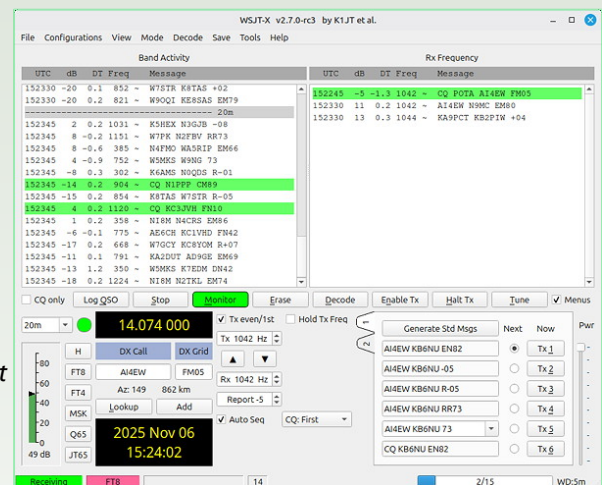
After selecting the appropriate audio input, I was receiving and decoding FT8 signals.

Even though I was receiving and decoding signals, I could see that the received audio level was a little low. A level of 30 dB is recommended (with the antenna disconnected), but mine was down near 18 dB. To get this up to 30 dB, you have to increase the USB AF/IF Output on the IC-7610,

To do this, you press the MENU button, then on the screen, press SET->Connectors->USB AF-IF Output Level->AF Output Level, then set the level. I set the level to 20%, and that did the trick.

Setting up for transmit

I tried selecting a station calling CQ and then replying to it, but I wasn't getting any output. I found this YouTube video, "[How to set up FT8 with WSJT X on the IC-7610 via USB](#)," which helped me get the application and





the IC-7610 set up properly, but because the installation was on a Windows box, it didn't really give me all the info that I needed.

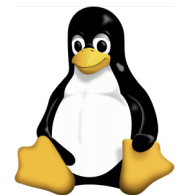
In particular, I found that I had to set the USB MODLevel to a much different value than shown in the video. To set this level, you press the MENU button, then on the screen, press SET->Connectors->MOD Input->USB MOD Level, then set the level.

This level was set very low, so it's no wonder that I wasn't getting any power output. I set this value to 15%, but noticed that I was getting some ALC. I reduced the value to 10%, and voila, I was transmitting. I made my first contact with KQ4VOB shortly afterwards. As I'm sitting here in the shack, I just made a contact with N3FAR, hopefully another QSL for my collection of QSLs from stations whose callsigns spell words.

Even though I'm making contacts, I'm still not quite sure that I have the output levels set quite right. I'm going to have to consult with some of the folks in our club who are more experienced FT8 operators.

I still want to work meteor scatter, too, and WSJT-X has a mode—MSK 144—for doing just that. [The Leonid meteor shower](#) has started already; it's expected to peak November 16-17. The [Geminid meteor shower](#) will peak in the middle of December. K5ND has a great page on [how to work meteor scatter using WSJT-X](#).

~ Dan KB6NU



44 Years of 44 Net



44 years ago, Hank Magnuski, KA6M, asked for some IP addresses for ham radio experimentation. He was assigned a /8 block, or 16,777, 216 addresses. We now know this block addresses as 44Net. 44 Years of 44 Net

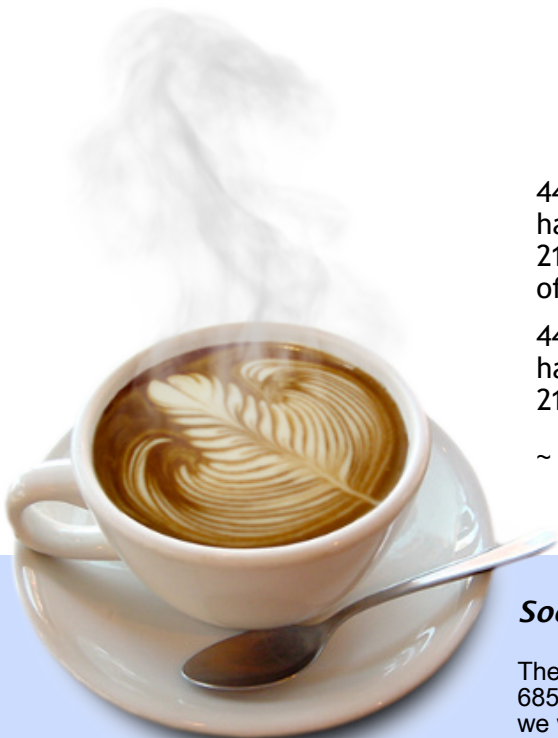
44 years ago, Hank Magnuski, KA6M, asked for some IP addresses for ham radio experimentation. He was assigned a /8 block, or 16,777, 216 addresses. We now know this block addresses as 44Net.

~ Dan KB6NU

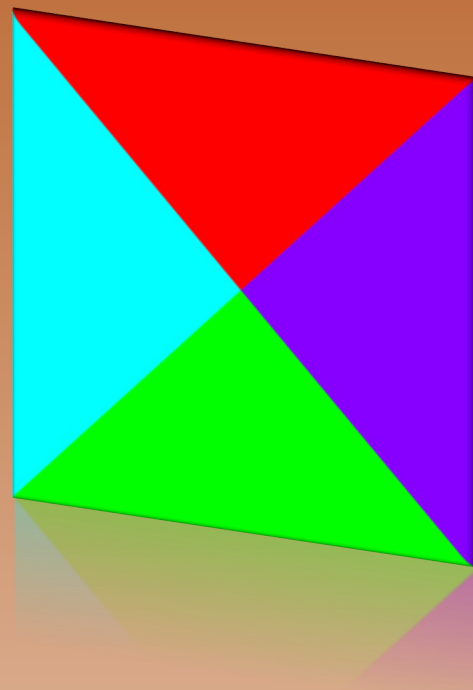
Social Reminder

The Saturday weekly social gathering is once again 'on' at the Denny's Restaurant, 6850 King George Blvd., Surrey BC from 07:30—09:30. All are invited. Afterwards, we will host workshops and will be available to invigilate Amateur Radio exams at the OTC, 5756—142 Street, Surrey from 10-noon.

Bring your ham issues, our Elmers will try to help you sort them out.



Foundations of Amateur Radio



I have a problem with logging

by ONNO BENSCHOP VK6FLAB



**Onno Benschop
VK6FLAB**

To listen to the podcast, visit the website: <http://podcasts.vk6flab.com/>. You can also use your podcast tool of choice and search for my callsign, VK6FLAB.

Full instructions on how to listen are here: <https://podcasts.vk6flab.com/about/help>

The first step in solving any problem is recognising that there is one. In my case the name of that problem is "logging". Specifically the storage and collection of my amateur radio contact logs.

Just to be clear, the actual process of logging is fraught .. what do you log, as in, which pieces of information are germane to the purpose of logging, do you log your own callsign, or do you only collect that once per session, do you log in UTC, or in local time, if you're logging in local time, do you record where you're logging, do you record what power level, which antenna, what radio, the battery voltage, you get the idea.

Then there's... when do you log? Do you log each and every session on-air, weekly nets, chat sessions on the local repeater, do you log the time when you establish the contact, once you've deciphered their callsign, or once the contact ends, and if you never wear a watch, how do you know what time it is?

What do you log with? Is it using pen and paper, pencil and paper, on a sheet of A4, or A5, in a binder, in a scrapbook, in an exercise book, in a journal, a diary, on ruled, grid or on plain paper, or do you log with a computer and if you do that, using which of the seven gazillion logging packages that are available to you?



I'm not talking about any of those things, though I suppose you could argue that I'm addressing one of the gazillion options, but stick with me.

I have, sitting on my desk, fourteen different logbooks. That's not unreasonable, almost one for each year that I've been licensed. Except that these books are not in any way consistent, they're essentially bound pieces of scrap paper with log entries scribbled in the available space, sometimes I've reversed a spiral notebook, just so I can avoid the spiral with my writing hand, sometimes it's oriented in landscape, other times in portrait. Some are smaller than A5, others are foolscap and intended for accounting purposes.

Next to that pile are too many empty logbooks, intended for future use. Why so many, you ask? Well it goes like this. You go to the office supply store to look for a suitable logbook. You buy it and try it. You use it for a bit and decide that you either love or hate it. If you hate it, you go back to the store to try and find another one. If you love it, your problem becomes finding an identical logbook. In a fit of inspiration, I loved the grid layout of my tiny spiral notebooks, and decided that this was the one for me, but they're no longer available, so instead I bought twenty A4 7mm grid exercise books with a soft cover, which I hate, and that was after trying to get a third Account Book Journal with a hard cover. There's also several A5 spiral bound books, but they're too chunky for portable operation and their spiral is annoying for logging.

There's also various empty ring binders and paper ready for logging in the garage. Who knew that there are apparently multiple disconnected universes where so-called universal loose-leaf hole punched paper doesn't fit ring binders with more than two rings, I suppose that's like different implementations of the same version of ADIF, but I'll admit that I'm bitter and have digressed well off topic. I will say this, stationery and I clearly have an unhealed relationship.

That's not the half of it.

My computer has at least 208 ADIF and Cabrillo files on it. I say "at least", since that's the ones I found when looking for ADI, ADIF and CAB files. Removing identical files, nets me 171 text files which I'm pretty sure are all log files, 50-

thousand lines, but that's with some having a one line per contact and others having a dozen, depending on which software wrote the file.

It's going to take a moment, since those 208 files are scattered among 74 different directories. Then there's the files that "wsjt-x" and "fldigi" create, but right now I'm not sure what the extensions for those are, I think one is called "all.txt", and looking inside, it helpfully does not have a year in the logged data, so that's fun. My computer also has logs in "cqrlog", "xlog" and "VKCL", probably others.

Then there's the logs I have online. The log for F-troop is a single spreadsheet, it has nearly 10,000 entries. I know that there's other files online and likely in other places like the various clubs I've operated at .. fortunately or not, most of those were done with the club callsign, so I'm calling those out of scope, at least for now.

Then there's the entries in LoTW, Clublog, eQSL, probably QRZ and likely more.

It all started out so innocently. I made my first contact in 2011 and forgot to log it. Since then I've been extolling the virtues of making sure that everyone around me logs their first contact.

Meanwhile I've been pulling my hair out trying to make sense of the fragmented disaster that is represented by logging in amateur radio. I'll take responsibility for my own mess, but I have to point the finger at my predecessors who still cannot agree on what to log, how to log and how to store or convert it, despite a century of logging.

It's not for the want of trying. It's that the nature of logging in this hobby is less than consistent, to say the least. Each contest wants their log in some special format, logging tools pick their own format that's incompatible with that of another tool, if you're lucky that incompatibility is obvious, but more likely than not it's subtle.

Among all those sources of log entries that I've mentioned are undoubtedly going to be duplicate contacts. There's going to be incorrect transcriptions, inaccurate record keeping, wrong times, missing years and all the other things that come to mind when you describe a data entry problem.



Fortunately I have some experience with data entry.

It was the transcribing of a recent POTA, or Parks On The Air, log that triggered an insight for me. Faced with the reality of entering contacts into something electronic, based on a bound notebook with log entries scribbled all over it, basically a pretty piece of scrap paper, I needed to solve a specific problem. Namely, the fact that I was entering this data for another amateur, who would be uploading it into the relevant POTA system. I had no idea what the field requirements were, didn't know where they'd be uploaded to, nor what format they needed, so I improvised, figuring that getting both the logged and inferred data into some table would be a good start, so I used a spreadsheet.

After completing the task, I had my epiphany.

What if I logged ALL my contacts in a spreadsheet?

I can sort it by whichever column I want, I can have as many columns as I need, a squillion rows if I make that many contacts, I can convert it to whatever format the next contest manager desires and I can back it up like any other spreadsheet. Better still, it's software agnostic. If I suddenly discover the next best logging tool since toasted sliced bread with creamed honey, I can convert my sheet into something that's required. Better yet, I can extract the data from that tool and put it back into the spreadsheet after discovering the author has a propensity of making random changes that are incompatible with my worldview.

So, spreadsheet.

Oh, yeah, I won't be using Excel, it has a, let's call it, nasty habit of converting anything that remotely resembles a date into one, even when you don't want it to. Clippy lives on... apparently.

track of which logs I've entered, I'll put a coloured dot on a page when I've entered it into my spreadsheet. Once a logbook is entered, I'll mark it in some way too. Then I'll have to massage the existing electronic data. I can't wait.

How have you solved your contact logging problem?

~ I'm Onno VK6FLAB

All podcast transcripts are collated and edited in an annual volume which you can find by searching for my callsign on your local Amazon store, or visit my author page: <http://amazon.com/author/owh>. Volume 7 is out now.

Feel free to get in touch directly via email: cq@vk6flab.com, follow on twitter: [@vk6flab](https://twitter.com/vk6flab) or check the website for more: <http://vk6flab.com/>

If you'd like to join a weekly net for new and returning amateurs, check out the details at <http://ftroop.vk6flab.com/>, the net runs every week on Saturday, from 00:00 to 01:00 UTC on Echolink, IRLP, AllStar Link, IRN and 2m/70cm FM via various repeaters.

If you'd like to participate in discussion about the podcast or about amateur radio, you can visit the Facebook group: <https://www.facebook.com/groups/foundations.itmaze>

This podcast episode was produced by Onno (VK6FLAB). You can find more at <http://vk6flab.com/>

Hackaday One Hertz Challenge: UHF Foxhunt Transmitter

This is a clever Spartan build. In order to create a radio [beacon](#) for use in a "fox hunt" [Jim] combined a SR-T300 walkie talkie module with a phototransistor and oscillating LED circuit. The phototransistor and oscillating LED are secured face-to-face inside heat shrink tubing which isolates them from ambient light. When the LED flashes on the phototransistor powers the radio which transmits a tone in the UHF band. ~ HACKADAY

Back to Basics

From The Canadian Basic Question Bank

Near Vertical Incident Skywave



John Schouten VE7TI has been teaching amateur radio courses for over 25 years, and is the Course Coordinator for Surrey Amateur Radio Communications

This edition we will examine a popular type of antenna. Why is it useful? Well you have learned that most HF antennas are designed for worldwide propagation. The radiation pattern favours a 15 degree takeoff angle because we normally want to work stations around the globe. But what if you wish to work nearer stations on HF, as may be the case of a domestic contest or for emergency purposes? In a significant emergency or disaster, speaking to a station in Japan or Europe may not be of much use, but stations within 1,000 miles may be able to render assistance more efficiently. This is where the Near Vertical Incident Skywave (NVIS) antenna plays an important role.

The Canadian Basic Amateur Radio Question Bank has a new question in the July 2025 revision:

B-007-001-002

What does near vertical incidence skywave (NVIS) propagation enable?

- a. Continent-wide communications
- b. Medium range HF communications, especially in difficult terrain
- c. Multi-hop HF worldwide communications
- d. Regional communications above the critical frequency

Near vertical incidence skywave (NVIS) propagation is a distinctive high-frequency (HF) radio technique that enables reliable medium-range communications, particularly where terrain or infrastructure obstructs other radio methods such as ground wave or line-of-sight transmission. NVIS is widely used in military, emergency, and amateur radio contexts across regions where nearby communications are essential but conventional VHF or UHF frequencies cannot surmount obstacles like mountains, heavy forests, or deep valleys.

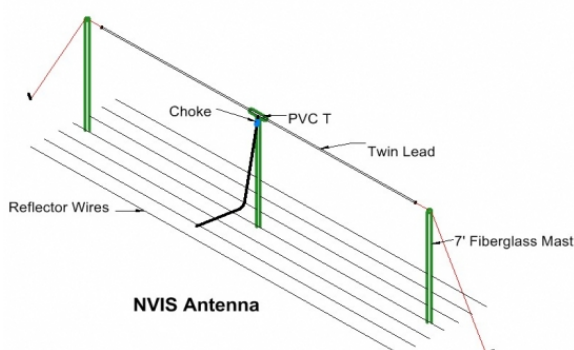
The principle behind NVIS is the radiation of radio waves almost vertically—usually at angles greater than 60 degrees—from a horizontally mounted, low-to-the-ground antenna. These signals travel upwards into the ionosphere's F

layer, where the waves are refracted and returned earthward, blanketing an area typically in the range of 100 to 650 kilometers (around 60 to 400 miles) from the transmitter. This mode is particularly effective in enabling communication where ground wave dissipates beyond a few dozen kilometers, and low-angle skywave begins at distances too far for regional networks. Selecting the proper HF frequency for NVIS is critical: frequencies too low are absorbed by the ionosphere's D layer, while those above the F layer's critical frequency escape into space instead of returning to Earth. Thus, operators must determine the optimal frequency, which tends to vary with time of day, season, and solar activity, to ensure ionospheric refraction for the intended region. The antennas most often used for NVIS are horizontal wires placed very close to the ground—often under 15 feet—substantially lower than conventional DX antennas, which further enhances the vertical energy launch while suppressing low-angle skip. Unlike multi-hop global communications that use shallow elevation angles to hop signals long distances around the globe, NVIS intentionally avoids skip and “dead zones” by directing most of its energy straight up, resulting in a signal that covers broad regional distances without relying on repeaters, satellite links, or fragile infrastructure. This property makes NVIS vital in disaster areas, remote landscapes, and during emergencies when terrestrial networks are damaged or unusable, allowing emergency communicators to deploy basic wire antennas and HF radios to maintain contact with neighboring bases, governments, or relief agencies. In Canada and similar environments, NVIS propagation enables medium-range HF communications that are robust in difficult terrains—precisely reflecting the correct answer “B: Medium range HF communications,

especially in difficult terrain” from the question bank. Other choices in the question either overstate NVIS's coverage (it is not continent-wide or multi-hop worldwide in application), misconstrue its frequency dependency, or misrepresent how the critical frequency actually limits, not expands, coverage. NVIS does not operate above the critical frequency but relies on ionospheric refraction below or near it; above the critical threshold, signals are lost into space rather than returned to Earth for regional coverage. Additionally, while there are occasional reports of continent-wide or even DX signals from NVIS antenna setups, these rare events are the product of conventional skywave propagation under unusual conditions, not NVIS in a strict technical sense. Therefore, amateur radio operators deploying NVIS must understand both its unique capability for regional communications and its operational limitations, tuning their antennas and selecting their HF frequencies to align with ionospheric conditions for day-to-day use within their province or adjoining states. Fundamentally, NVIS empowers radio operators in Canada and elsewhere to achieve consistent, infrastructure-independent communications over hundreds of kilometers, succeeding where VHF/UHF signals fail due to line-of-sight limits and where multi-hop HF communications are unnecessarily complex or unreliable for intermediate distances. This system allows coverage of entire provinces and neighboring territories, ensuring vital links for public service operations, amateur nets, disaster response, and remote station checks. Amateur NVIS operation involves tuning wire antennas to bands such as 80 or 40 meters, mounting them low, and testing at various times to optimize frequency for current critical frequency values—an ongoing practice for any operator wishing to maintain robust and flexible regional HF coverage in challenging settings.

Optimal frequencies for NVIS operation

The optimal frequencies for NVIS (Near Vertical Incidence Skywave) operation fall within the HF spectrum, most commonly ranging from approximately 2 MHz to 10 MHz, though effectiveness depends strongly on time of day, season, and current solar and ionospheric





conditions. NVIS propagation requires a frequency that is low enough to be refracted by the ionosphere's F layer at high elevation angles, but also sufficiently high to avoid excessive energy loss to D-layer absorption, particularly during daylight hours. During nighttime or periods of low solar activity, frequencies between 2 MHz and 4 MHz (such as the 80-meter and 75-meter bands) are typically most effective, since both the critical frequency (foF2) and D-layer absorption are lower. In daylight or summer, frequencies between 4 MHz and 8 MHz (like the 40-meter and 60-meter bands) tend to be better, as the rising critical frequency of the F layer allows higher signals to be returned, while the D layer simultaneously attenuates the lowest frequencies—making 60 meters often ideal for NVIS in the mid-latitudes. Operators should always aim to select a frequency just below the current critical frequency (foF2) for reliable NVIS; a practical guideline is to choose a working frequency about 15% below foF2, sometimes referred to as FOT (Frequency of Optimum Transmission). Real-time ionosonde data and propagation maps can help operators track changes in foF2 and adjust band selection accordingly for NVIS coverage. Frequencies above the critical frequency will pass through the ionosphere into space and not support NVIS propagation, while those below the lowest usable frequency (LUF) will be heavily attenuated by the D layer, especially during the day. This dynamic means amateur operators should be ready to switch bands throughout the day or season, moving from 80 meters in early morning and late evening, to 60 meters mid-morning, then to 40 meters from noon to late afternoon as propagation fluctuates. The choice of band is further influenced by latitude: tropical regions experience higher optimum frequencies due to stronger solar ionization, while northern latitudes require lower frequencies for reliable NVIS. Ultimately, operators seeking NVIS success must balance between high enough frequency for D-layer avoidance and low enough to ensure F-layer refraction, carefully monitoring real-time ionospheric conditions for best results.

What antenna height gives best NVIS radiation angle

The best NVIS (Near Vertical Incidence Skywave) radiation angle is attained by mounting a

horizontal antenna at a height between 0.1 and 0.25 wavelengths above ground, which focuses the signal nearly straight up to maximize ionospheric reflection at high elevation angles. For the popular amateur bands, this typically means heights in the following ranges: approximately 10 to 20 feet (3-6 meters) for 40 meters, and around 20 to 41 feet (6-12 meters) for 80 meters, with optimal gain generally found near 0.15 to 0.22 wavelengths for most band choices. Installing a dipole or inverted-V antenna at these low heights ensures the majority of radiated energy is directed upwards, which is critical to NVIS performance and regional coverage. Raising the antenna much higher than 0.25 wavelengths shifts the maximum radiation angle lower, making the antenna less effective for NVIS and more suitable for long-distance (DX) communication. Conversely, putting the antenna much lower than about 0.13 wavelengths increases ground losses and degrades signal strength. Practical recommendations for best NVIS results suggest targeting 0.18 to 0.22 wavelengths for reliable high-angle radiation, putting the main lobe nearly vertical and optimizing coverage for areas where obstacles or terrain would defeat line-of-sight or ground wave signals

Having reviewed NVIS, the correct answer to the question...

B-007-001-002

What does near vertical incidence skywave (NVIS) propagation enable?

- Continent-wide communications
- Medium range HF communications, especially in difficult terrain
- Multi-hop HF worldwide communications
- Regional communications above the critical frequency

The correct answer is b. Medium range HF communications, especially in difficult terrain.

~ John VE7TI



Amateur Radio Handheld as a modular option of a new electric car

Marques Brownlee is a well-spoken and refreshingly non-hyperbolic YouTube creator and tech reviewer. His latest review was of an [Xiaomi electric car](#) that's currently unavailable (for purchase) in the US. I recommend the video - draw your own conclusions about the quality of this vehicle, and the implications.

Brownlee makes an interesting point that the overall software and user-facing tech of this vehicle is excellent. Prior to expanding to electric vehicles, Xiaomi made mobile phones, so the vehicle designers really embraced good user interface design, including tactile controls such as switches for common functions.



One of the funnier bits of the video was Brownlee explaining the various modular options of the vehicle... including a handheld UHF two way radio (at 7:22)...

Really... as Brownlee explains it, this handheld radio is just one of many different modular options available for this vehicle. (Brownlee is apparently not an Amateur Radio Operator as he didn't recognize the significance of the displayed frequency given that he was doing his vehicle testing in the US. If I wanted to have a bit of fun, I'd reach out to Xiaomi public relations and thank them for supporting Ham Radio... and enjoy the confusion on their part.)

One of the nice aspects of this vehicle is that there are apparently a number of magnetic docking points on the interior for mobile phones. But they could probably also support a wireless control head for a two way mobile radio. Or maybe Xiaomi will offer a mobile radio as another modular option for this vehicle.

The video is at:

<https://www.youtube.com/watch?v=Mb6H7trzMfI>

~ Steve Stroh N8GNJ

Courtesy of [Zero Retries](#) issue 0231

RSGB 2024 Convention: Beginners' 3D printing for amateur radio - Tom Wardill 2E0JJI

3D Printing is a powerful tool, and one that has become increasingly accessible in recent years. This presentation is a brief overview of how to get started and where it can be useful in your life as an amateur radio enthusiast. Tom covers as much as possible, including machines, software, tools and where to find things. He aims to leave you in a position to learn more and get yourself started: <https://www.youtube.com/watch?v=CLgUhOAbSIQ>



No-ham Recipes

Winter Field Day

SNOW MUFFINS

By Marilyn Goodwin VE7IIN

Some of our readers in warmer climates may have a problem with this recipe, but we are assured that, in the absence of snow, frost scraped from the freezer may be used instead. Apparently the frost or snow helps the muffins rise.

According to Marilyn, "This recipe was given by Northern women Bertha Allen and Helen Redwood to the Ladies of the Ascension Church for their cookbook, "Favourite Recipes." The cookbook was published in Inuvik, NWT in the 1960s."

So next time it snows, scoop some up and try this Canadian twist on an old recipe!

- 2 cups (500 ml) all-purpose flour
- ½ cup (125 ml) sugar
- ½ teaspoon (2.5 ml) grated lemon or orange rind
- 3 teaspoons (15 ml) baking powder
- ¾ cup (200 ml) milk
- 3 tablespoons (45 ml) melted butter
- ½ cup (125 ml) raisins
- ½ cup (125 ml) clean white snow
- [Optional] Chocolate chips and/or icing sugar for decoration

Preheat oven to 400F (200C or a moderately hot oven)

Mix dry ingredients in a bowl. Make a depression in the center and pour in the melted butter and grated rind. Stir lightly, and then add snow, raisins and milk. Stir only until dry ingredients disappear. Do not over mix.

Spoon into 12 greased muffin tins. Bake for 15 to 18 minutes.

~





January 2026

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
				1	2	3
	Event details: SARC—SEPAR 'Live' calendar link All contest information: WA7BNM Contest Calendar: Home					Coffee: 0700 Denny's King George Blvd. & 68 Avenue OTC Open 0930 Contest: ARRL Kid's Day 18-2359 UTC
4	5	6	7	8	9	10
	1940: Armstrong demonstrates FM to the FCC 1838: Morse Code privately demonstrated	1930 SEPAR Net 2000 SARC Net			1943: Nicola Tesla dies	Coffee: 0700 OTC Open 0930 : Contest: NA QSP Party (CW)
11	12	13	14	15	16	17
Contest: NA QSP Party (CW)	1949: Claude Shannon proves mathematics of Nyquist Theorem	1930 SEPAR Net 2000 SARC Net	SARC General Zoom Meeting 1900-2100			Coffee: 0700 OTC Open 0930 HotSpot Workshop 09:30 Contest: NA QSO Party (SSB) & Contest: ARRL VHF
18	19	20	21	22	23	24
Contest: NA QSO Party (SSB) & Contest: ARRL VHF		1930 SEPAR Net 2000 SARC Net				Coffee: 0700 OTC Open 0930 Winter Field Day
25	26	27	28	29	30	31
Winter Field Day 1915: The first Intercontinental telephone call			SARC Directors Meeting 1900-2100			Coffee: 0700 OTC Open 0930



February 2026

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
1	2	3	4	5	6	7
1942: The Voice of America was introduced		1930 SEPAR Net 2000 SARC Net Worldwide Sideband Activity Contest		1916: Alexanderson successfully tests multiple tuned antenna		Coffee: 0700 Denny's King George Blvd. & 68 Avenue Contest: BC , Minnesota, Vermont QSO Party & + European Union DX Contest
8	9	10	11	12	13	14
Contest: BC , Minnesota, Vermont QSO Party & + European Union DX Contest	ARRL School Club Roundup (1300Z, Feb 9 to 2359Z, Feb 13, 2026)	1930 SEPAR Net 2000 SARC Net	SARC General Zoom Meeting 1900-2100		Contest: YLRL YL-OM Contest	Coffee: 0700 OTC Open 0930 Contest: YLRL YL-OM Contest & CQ WW RTTY WPX
15	16	17	18	19	20	21
CQ WW RTTY WPX Contest		930 SEPAR Net 2000 SARC Net 1878: Edison receives patent for phonograph		1975: Harris introduces the first solid-state radio transmitter		Coffee: 0700 OTC Open 0930 ARRL Inter. DX Contest, CW
22	23	24	25	26	27	28
ARRL Inter. DX Contest, CW 1857: Heinrich Hertz born in Hamburg, Germany 1916: Ernst Alexanderson granted US patent for a selective tuning system		930 SEPAR Net 2000 SARC Net	SARC Directors Meeting 1900-2100			Coffee: 0700 OTC Open 0930 North American QSO Party, RTTY
				Event details: SARC-SEPAR 'Live' calendar link All contest information: WA7BNM Contest Calendar: Home		

Radio-Active

Profiles of SARC members

Blake R. Wiggs VA7BWG

presented by BLAKE R. WIGGS VA7BWG



Blake VA7BWG

I've had at least four major opportunities to get into the amateur radio hobby but I was oblivious to all of them and had no involvement with the hobby until a decade after I retired.

First missed opportunity

My father (born and raised in Vancouver) was a lifelong ham. He obtained his first call sign¹ in 1935 at age 16. Amateur radio was a big deal in those days. Dad's high school (Vancouver Tech) had an active amateur radio club. The local newspapers printed daily updates pertaining to amateur radio activities. By the time I came along Dad had been involved with the hobby for the better part of two decades. I quickly got caught up in some minor aspects of the hobby—and hated it.

Specifically, on weekends, I involuntarily spent hours bored to tears in shops that sold surplus electronic equipment—all of it completely foreign to me. Why did Dad drag me along on these expeditions? It was partly to give my mother a break, but primarily because he was colour blind. I recall being prodded to read the colour banding on electronic

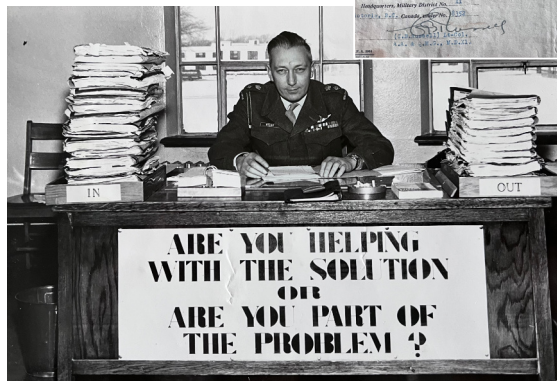
¹ VE5QE - between 1929 and 1946 amateur radio operators in British Columbia, the North West Territories and Yukon Territory were allocated call signs prefixed VE5. Dad also had call signs VE1ZG, VE3DTM, VE4FQ and DL2AS as the military moved him around. He had the call sign VE7FFF when he became a silent key in 1994.



components: "...see if you can find some brown, black, orange and gold ones in this bulk bin" (translation: he needed 5% 10KΩ resistors). Dad had an extensive shack but children were not welcome in it, due to the significant safety hazards presented by homebrew (or even ready-made) gear in those days.

Second missed opportunity

Dad served 37 years (1933 - 1970) in the Canadian Army Signal Corps. I grew up on army bases. This afforded all sorts of ways to get into trouble. I vividly recall coming home and proudly displaying some ancient ammunition that my friends and I had somehow managed to locate and dig up. Dad wasn't pleased! He marched me to the site and made me stand by while a group of soldiers thoroughly excavated the site, removed all traces of ammunition and rendered it safe.



[Top] Army Signalling – First Class, Line Telegraphy certificate issued to Signalman F.R. Wiggs in 1934.

[Below] Lt. Col. F.R. Wiggs, MC, CD – C/O Royal Canadian School of Signals 1961 – 1965

But army bases—especially the one in Kingston, Ontario where I spent the better part of 18 years—were a gold mine for anyone interested in radio. At least that was the case in the 1950s and 1960s, since that is where the Royal Canadian School of Signals (now the Canadian Forces School of Communications and Electronics) was located. We lived very close to the school—which is where Dad worked.

He brought home all sorts of electronics and radio training manuals intended for training army recruits.

It wasn't just book learning either. Recruits and everyone else in the Field Army—Dad included—regularly participated in extensive training exercises featuring all sorts of radio equipment, terrain and operating conditions, including mock opposing forces. But not me. Dad didn't push it on me, possibly because he didn't see the Army as the best career opportunity for me.

Third missed opportunity

I wound up graduating in electrical engineering (UBC class of 1972). The UBC Amateur Radio Society (UBC ARS) was more active in those days than it is today, but I wasn't part of it. Several of my classmates were (and still are) hams. I enjoyed the communications theory courses, which were heavy on the math and light (to put it mildly) on the practical side. In any case I was much more interested in the few computer-related courses offered in those days by UBC's electrical engineering department. (Today UBC offers complete programs in either electrical or computer engineering—as well as many other engineering disciplines).

Fourth missed opportunity

In the early 1970s local job opportunities for graduating electrical engineers were somewhat limited. The options were basically: BC Hydro (where about 25% of my classmates worked until retirement); BC Tel (now Telus—where about another 25% of my classmates worked until retirement); and GTE Lenkurt Electric (Canada) Ltd. (where about 10 of us worked, including me). Some other classmates left the province to pursue opportunities in electrical engineering elsewhere.

Lenkurt manufactured microwave radio systems and associated multiplex equipment. The primary customers were telephone utilities—both



The Lenkurt assembly line circa 1976



Canadian and International. Lenkurt's plant was located in Burnaby at the southwest corner of Lougheed Highway and Bainbridge Avenue.

In addition to microwave / multiplex gear, Lenkurt made supervisory systems. The basic idea was to transmit a signal indicative of an abnormality or failure at an unmanned remote site (e.g. a microwave site atop a mountain) to a manned control site. I worked in Lenkurt's supervisory systems group. This was the mini-computer era, well over a decade before personal computers came along. Computers were highly specialized in those days. For example, if you wanted a hard drive back then you didn't just plug one in and expect it to work. First you had to find one, which was tricky because we did not have Amazon or Best Buy. If you managed to find a hard drive you then had to build a custom hardware interface so the computer could talk to the disk drive and vice versa. You also had to code a custom piece of software called a device service routine so the computer's operating system could talk to that custom hardware interface. Building that stuff involved a lot of careful design and custom fabrication.

The first project I worked on at Lenkurt was very memorable. Lenkurt was contracted to supply a supervisory system as part of a telecommunications system ordered by the government of Iran to modernize the Iranian telephone system. This was a major undertaking for Lenkurt, constituting the company's first foray into computerized systems. The accompanying Lenkurt brochure cover shows the system Lenkurt shipped to Iran. The rack in the

central background holds five Data General Supernova minicomputers, with a pair of Supernovas in each of the left and right racks and a fifth Supernova in the central rack. Each Supernova pair ran in hot standby mode, with the central Supernova also in hot standby to provide tertiary redundancy¹.

This was quite sophisticated for the time. A key part of the system was the operating system software which Lenkurt sub-contracted locally to two guys—John MacDonald and Vern Dettwiler²—who had recently formed their now famous eponymous company MacDonald Dettwiler & Associates (now MDA).

Lenkurt presented an ideal opportunity to get

¹ Two computers configured in hot standby mode work as a primary-backup pair. The primary (active) computer handles all operations and continuously sends updates to the standby computer. The standby computer runs in parallel and keeps its state synchronized with the primary. If the primary computer fails the standby computer takes over seamlessly. In Lenkurt's dual-pair system the fifth computer is connected to both pairs and maintains enough synchronized state or replicated data from both systems such that if one pair completely fails the fifth computer takes over that pair's workload as the active computer.

² Dr. John S. MacDonald taught the electronics courses when I was a UBC electrical engineering undergrad; Vern Dettwiler was in charge of technical operations at the UBC Computing Center.



Lenkurt 51-H brochure circa 1974



into amateur radio. The company's core business was radio and many of the people I worked with were hams. But, nope—not me. I was too wrapped up with computers. It was like being paid to work on my hobby—they'd have to pry me off the equipment and send me home each evening. But like all good things it didn't last. I saw my probable career path narrowing; for example Lenkurt didn't appear to be embracing microprocessors which were then becoming available in production quantities. So I left and in hindsight that was a smart move—Lenkurt ceased operations a few years after I left, forcing many of my former colleagues to seek other challenges.

Epilogue

I pursued higher education which morphed into a 36-year career from which I retired in 2014. During the Covid pandemic I noticed an ad for the Richmond Amateur Radio Club's Basic course, which I took and passed in 2021. However I didn't get a radio until mid-2024, after reading an article in IEEE Spectrum (see [The Most Hackable Handheld Ham Radio Yet](#)). I passed the advanced exam in November 2024 after a self-study binge, but I still have plenty to learn about the practical side of radio.

~ Blake VA7BWG

Restoring older gear

When restoring equipment, replacement of an old two-wire line cord with a three-wire modern AC cable is often desired. Sometimes it is easy to enlarge the line cord hole and install a three-conductor socket taken from a defunct piece of computer equipment. But often we need to use the original round hole and install a [Heyco Gland](#) [[Home Depot](#)].



WB4GRA has good advice as to the best way to do this. Quoting Dan: "The trick is to use 18/3 cable with an SVT jacket. Do not use 18/3 with an SJT jacket (very common) unless you go to a one size larger Heyco. The SJT cable is considerably thicker and bulkier than SVT for no greater current capability - it's still 18/3.

SVT cable diameter is 0.25" +/- maybe 0.0050, or so. Find an existing 0.5" hole or start with a tap with a straight bit and use a step bit to get 0.5"... Perfect."

6m Propagation

With the sunspot cycle having reached maximum and beginning to wane, we might see more geomagnetic activity and six meter opportunities. Here's a very simple ARRL article about a [six meter receiver](#) to take advantage of openings.

This receiver uses superregeneration for high sensitivity and low parts count. It can receive both FM and AM modulated signals.

This design differs from previous superregenerative circuits because it uses a "quench waveform" control to allow the reception of narrow-band FM. Receiver sensitivity is around 1 μ V. Builders can easily modify the radio to operate over a wide band of VHF. It is inexpensive (about \$20), can be built quite compactly and powered from a 9 or 12 V battery.





The RAC Winter Contest

Most of the excitement was on the 2nd day

by DOUG JEFFREY VA7JDJ



Doug Jeffrey VA7JDJ
reporting on SARC's
contesting efforts

The Radio Amateurs of Canada (RAC) Winter contest is one of 2 events sponsored by the organization. It is a unique contest where there is a significant increase in the score if you make contacts with stations in Canada and there are multipliers for working additional Canadian provinces or territories. It is a relatively short contest which only lasts for 24 hours. Making a QSO with an official RAC station is worth 20 points (There is one in every province). Any other Canadian station is worth 10 points, and all others are worth 2 points. It's a fun contest offering opportunity to score points everywhere from 2m VHF all the day up to 160m HF and most bands in between. Further scoring comes

from the multiplier for each of the 10 provinces and 3 territories that you may work.

The team started out strong with lots of contacts on 20m. The bands were busy and we ran up to a peak of 82Qs per hour on Saturday afternoon, but by evening the bands had gone very quiet. On my way out to the OTC around 21:15 I received a call suggesting that it may not be worth my while to come out based on how slow things had gotten. A review of conditions after the fact revealed no significant solar or geomagnetic events, but from 22:00 to about 01:00 there was little to be heard on any band.

Fortunately, this did not continue and after a few hours' things



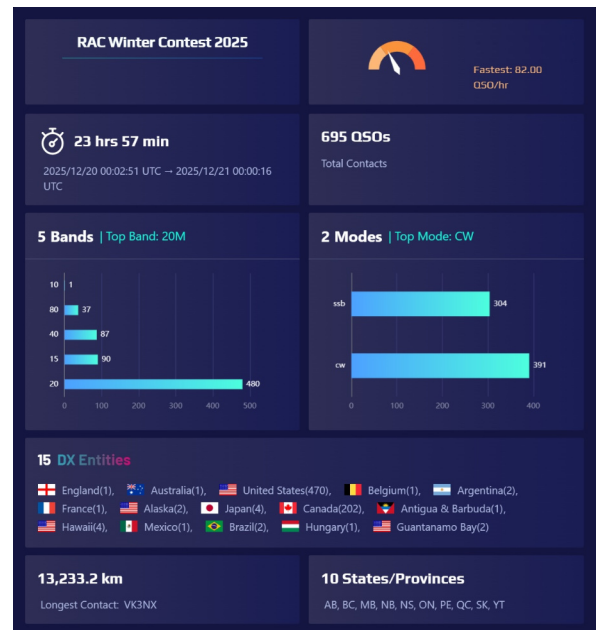
returned to normal. Slava relieved me and recovered well with CW as the bands opened up again.

Overall we managed 695 contacts. Over 200 were Canadian stations. In total we worked 10 provinces or territories.

Another radio mystery to explore!

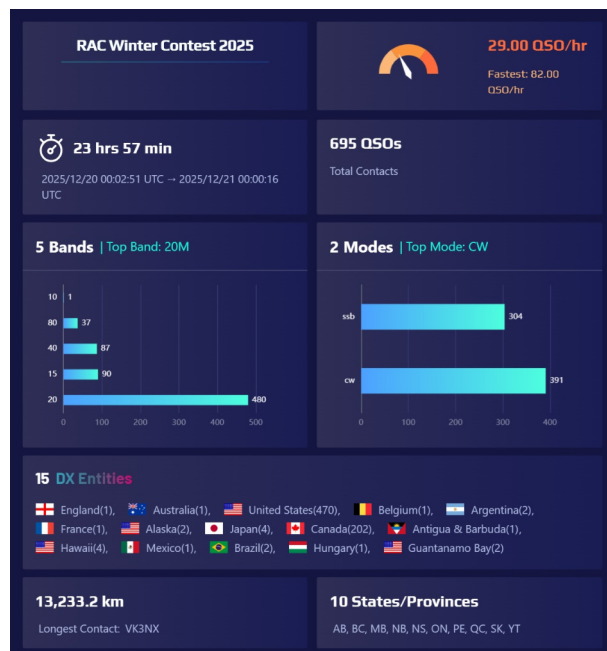
Signing off for 2025. I wish you the best for 2026 and hope to catch you on the air next year.

~ Doug VA7JDJ



The ARRL 10m Contest

by DOUG JEFFREY VA7JDJ



The second weekend of December is always reserved for the ARRL 10m contest. This year the SARC contest crew jumped in operating both in SSB (2 points per contact) and CW (4 points per contact). Multipliers are offered for each state or province that is worked.

In 2024 the club put in a very respectable effort and managed to pull in first place in our category (Canada, multi operator, single transmitter, high power) with a total score of 686,052.

Hoping to better our previous score, the team put in a strong effort and made a solid 389 QSOs during the 48 hours of the contest. Conditions were good allowing us to connect with VK2PN (Australia) over a distance of 12,500km on CW. Not to be outdone the SSB folks also made a contact with CB8E (Chile) over 12,300km!

Conditions were better on Saturday. We saw a maximum contact rate of 108 Qs per hour during the contest. *[see next page for details]*

Great job Everyone!

~ Doug VA7JDJ



2025 Field Day results are in

by ANDREW ELGIN VA7LGN

Field Day 2025 was another solid showing for the Surrey Amateur Radio Communications Society, with VE7SAR finishing 7th in Class F and 7th overall in Canada, posting a final score of 5,014 points. This result is a testament to the hard work and planning of many of our members, and was a great showcase of the contesting skills our membership brings to the table. Finishing in the top ten nationally is no small feat, especially given the depth of competition across the country.

Just as important as the score itself was the group effort that made it happen. Field Day only works when people come together to set up, operate, log, troubleshoot, tear down, cook, teach, and generally make things work when they shouldn't.





A big thank-you goes out to everyone who participated, whether you were behind a microphone or key, helping with logistics, or just lending an extra set of hands. It was very much a team effort, and the results more than reflect that.

If all of that sounds like fun, there's another opportunity coming up that's similar in spirit but significantly more character-building: Winter Field Day. This event is just like summer field day, except you trade sunshine and lawn chairs for frozen fingers, stiff coax, and the constant question of why you thought this was a good idea. Winter field day will take place on January 24th and 25th 2026 and details can be found at <https://winterfieldday.com/>. I'll likely be heading out to test a new grab-and-go kit of my own—assuming I can still feel my hands long enough to log contacts. Keep an eye out for a future article on that experiment, assuming I thaw out enough to write it.

73,

~ Andrew VA7LGN



November 2025



SARC General Meeting minutes

November 12, 2025

Recording Secretary MIKE PORISKYVA7YEG

Attendance: 28 members/guests attended online

Start Time: 19:00 hrs. Nov. 12, 2025

Location: Online via Zoom

Welcome & Presentation of Agenda - Steve called the meeting to order and gave a brief welcome message.

Presentation

Michael Papp WB6GJE, ex-software development manager at Apple computers, gave a stimulating talk on software defined radios, artificial intelligence and the future of radio technology, specifically photonic transceivers [see page 38 for the story]. This was followed by questions from members. Many thanks to Michael for bringing new ideas to SARC.

Steve gave a brief welcome message and displayed the evening's agenda.

Business Meeting

Steve VE7SXM called the meeting to order at 20:14 following the presentation by Michael Papp.

1. Announcements:

- Steve reminded everyone that SARC meets for breakfast on Saturday mornings at Denny's Restaurant on King George Blvd. and 68 Ave.

Also, following breakfast those interested are welcome to visit the OTC to work on projects, get answers to questions or just socialize.

- A soldering workshop will take place on Saturday (Nov. 29) for any members looking to improve their soldering skills. The cost is \$10 and includes the parts to build an LED flashing Christmas tree. Instructions to sign up will be in the bi-weekly bulletin.

On that topic the SARC bulletin is sent to all members every 2 weeks. To add or remove your name from the distribution list, send an email to membership@ve7sar.net. Also, If you would like to add a message to be sent out, forward the details to the above address.

2. Reports

- **Financial Report** - Scott VE7HA: The P&L Statement and Balance sheet were reviewed.
- **Nets & Website** - Reg VA7ZEB: A new net controller has joined the team in the past month. If anyone else is interested contact Reg at nets@ve7sar.net. A new protocol for the SEPAR net was tried last week and is working well. All members who participate in the SEPAR net at 7:30 pm on Tuesdays, are encouraged to learn more about the new protocol at ve7sar.net/separ.
- Reg has also developed a line-of-sight propagation viewer on his website at <http://va7zeb.ca/los>. The website uses NASA elevation



data to show signal reception where radio signals are not blocked by the terrain. The viewer does not take signal reflection or ground waves into account.

- **SEPAR/OTC** - Gord VA7GK: Gord attended a presentation given by Washington State. Gord also received praise from the group for the SEPAR net changes that were based on results from the Great BC Shakeout.
- During the past few weeks, maintenance and roof cleanup were done at the OTC.
- **Membership** - John B. VA7XB: Steady at 145. This year's RAC insurance application is in preparation. Insurance coverage includes asset loss/damage and liability up to \$5million which is available to both SARC and individuals who are RAC members. SARC only includes about 30% of our assets for insurance coverage. The premium is expected to be approximately \$2000. Director/Officer insurance is not currently under consideration.
- **Contest Nov 12** - Mike VE7YEG gave a recap of the CQ WW DX SSB contest that took place 2 weeks ago. Eleven operators made 1470 contacts. Propagation was great and most operators were busy. The next team event that SARC will participate in, is the RAC Winter contest that will take place December 19/20. We have not yet decided if SARC will apply for the VE7RAC callsign.
- **Repeaters** - Horace VA7XHB: Nothing to report.
- **AREDN** - Doug VA7JDJ: Doug gave a quick update on the changes made to the AREDN hardware at the repeater site. He is waiting for software updates to the switch as well as updates to the station at Mt. Benson.
- **Ham Class** - John S. VE7TI: Big changes are planned for the next class now scheduled to take place in the 3rd week of January. Several new instructors have volunteered to assist with both course development and presentation of 12 modules over 7 weeks. There are currently 50 students signed up. John suggested a limit of 75, pointing out that while the software can handle it, addressing all students questions on a personal basis might be harder with more than 75. The course aims to teach to the ISED question bank and not to a specific exam. Blake asked if he could sit in on the course to "re-learn" the content and was told that it would depend on the number of participants. Stan had a concern that it might take time away from actual student questions.

3. Old Business

- **Projects** - Doug VA7JDJ and John S. VE7TI are developing a project for SARC members to build a digital hotspot. This device allows transmission of digital signals for operating APRS, Winlink, WSPR, etc. through a portable radio. The project is planned for Saturday, January 17, for cost of \$100. Any members interested in building the Hotspot should let Doug or John know. Also, if anyone has ideas for other projects, please bring them forward.
- **The Flex** radio has been moved back to the OTC and is connected to the Expert linear amp for high power operation.
- **Bigfoot**: The parts have arrived and plans are being made to move the Bigfoot trailer to the vendor in Cloverdale for servicing.

4. New Business

- **Santa Claus Parade and Festival of Lights**: Andrew VA7LGN introduced Cloverdale's Santa Claus Parade and Festival of Lights; followed by a request for volunteers. The event will take place on Sunday, November 30th between 3-9 pm. He is hoping to fill 15 positions along the parade route and in the staging areas. Anyone interested should contact Andrew by email at va7lgn@gmail.com.
- **The SEPAR trailer** will enter the parade as a float. A driver will be needed and volunteers interested in helping to decorate should notify Andrew. The BIA building will be the location for net control.
- This year's **SARC Christmas party** will take place on December 6th, at 11 am. Built on the success of past years, this will be a pot-luck lunch and all attendees are encouraged to bring a dish or desert to share. Soft drinks, water, tea and coffee will be provided.

The floor was opened for discussion; requesting feedback or comments. None were received.

5. Adjournment

Steve moved to adjourn the meeting, seconded by Gord. Carried. The November meeting adjourned at 21:13 hours.

~ Minutes taken by Mike Porisky VE7YEG

The Christmas Social



SARC NEWS CLIPS



Fred Orsetti VE7IO recently did a bit of experimenting so he can use his car for operating POTA during the winter. He included a photo of his support mount using the POTA PERformer antenna.

Fred wrote that: "The RBN reports are from tests using 50 watts, so I should be able to have a successful POTA activation. The maximum power I can use is 70 watts then I begin to get some RF into the radio. This may be due to the radio position relative to the antenna and should be better when operating from the front seat.

I'm planning on rainy weather activations for over the winter. Sunny days I will use my normal antenna mounting."

~ Fred VE7IO



Thought I should let you know that my wife and I purchased a piece of land between Red Deer and Rocky Mountain House, near the town of Eckville. We are still in the very beginning stages of planning, but we hope we can move out there into a little cabin at the beginning of fall next year. I have already purchased a tower, 72' Tridon, used for \$400 from a rigging company that was taking down some oilfield towers. Will likely not be able to get it set up for another year, but a proper QTH of my own is slowly taking place!

I hope things at SARC are going well.

73,

Michael Birtles, ex VE7GMP, now VA6IM





Coming up...

On January 14, 2026 via Zoom our presenter is Jim Idelson K1IR

Jim will speak on his work in tower safety. Jim Idelson (K1IR) is a lifelong amateur radio operator, engineer, and technology executive with over five decades in the hobby. Licensed since age 12, Jim has designed, built, and operated high-performance amateur radio stations and competed at the highest levels of contesting and DXing. He is the founder of the Zero Falls Alliance, an initiative dedicated to improving tower and antenna safety in amateur radio. Jim has written for QST, NCJ, The Radio Amateur's Handbook, and The Antenna Book, and is a frequent speaker on station design, operating excellence, and safety.

Tower and antenna work remains one of the most dangerous activities in amateur radio. In this presentation, Jim Idelson (K1IR) presents the results of an exhaustive study of tower-related fatalities and serious accidents in the amateur radio community. Attendees will gain a clear understanding of the depth and scope of the problem, the most common root causes, and the key risk factors that lead to life-altering injuries and deaths. The talk concludes with practical, experience-based mitigation strategies that individuals and clubs can apply immediately to reduce risk and better protect climbers working at height.

On February 11, 2026 our presenter via Zoom is Greg Mihran, KJ6ER

Greg has been a recent contributor to The Communicator and he is the developer of the PERformer, Challenger and Dominator portable antennas for POTA, SOTA, Emergency Communications and HOA Deployments

These highly efficient homebrew portable antennas he has used for POTA (Parks On The Air) activations over the past few years. His antennas are also ideal for emergency communications as well as quick deployment HOA antennas. He always shares his antenna plans for free in PDF-format with the worldwide amateur radio community.

His most popular antenna is the ARRL™ QST award-winning PERformer (Portable, Efficient, Resonant) elevated quarterwave vertical for 40M-6M leveraging a 17' telescoping whip with two elevated tuned radials 90 degrees apart for some directivity and gain. This portable antenna, with radiation efficiency over 90%, has been in the field for more than five years and is used by thousands of portable antenna enthusiasts around the world for excellent regional and continental communications.

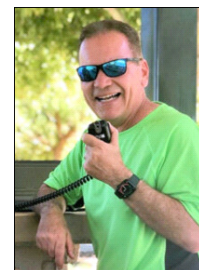
His 2-Element Parasitic PERformerArray provides up to +3.1 dB gain over a single PERformer antenna with a 7.7 front-to-back ratio. His parasitic array includes two PERformer antennas: one as an active radiator fed with coax and the other as a passive reflector placed a quarter wavelength behind it. The 2-Element Phased PERformerArray using electrical length cables to two PERformer antennas provides +4.25 dB more gain than a single PERformer and up to a 22.0 dB front-to-back ratio. The PERformer NVIS Antenna, provides high-angle

radiation for HF communications across 40M-6M into the skip zone between ground wave and first hop sky wave communications.

His Challenger off-center fed halfwave omnidirectional vertical for 20M-6M leverages a 25' or 17' telescoping whip and a 4:1 unun on a tripod with a single linked counterpoise. This portable antenna, with efficiency over 94%, is an excellent antenna for both continental and global communications.

His Dominator end-fed halfwave omnidirectional vertical for 17M-10M leverages a 25' or 17' telescoping whip and 49:1 or 56:1 unun on a tripod with a single linked counterpoise. This portable antenna, with efficiency over 90%, has been in the field for more than two years and is an excellent portable DX antenna for global communications on the upper bands.

Greg, an Extra-class amateur radio operator based in Campbell, CA, has been operating HF/UHF/VHF since 1987. He has been especially active since retiring in 2022 after a long career in Silicon Valley technology companies. He and his wife, Bonnie, have 5 adult children and 6 grandchildren. He also loves to play 'bogey' golf, compose and perform original rock music, and hike around the beautiful California foothills with his ICOM IC-705 backpack.



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The SEPAR Report

A Grab 'n Go Kit

by GORD KIRK VA7GK



Gord Kirk VA7GK
is a SARC Director
and the City of Surrey
SEPAR Coordinator

As we were wrapping up the year SARC/SEPAR had the opportunity to provide parade communications for the Surrey Santa Parade of Lights in Cloverdale (Surrey) in December. We had 10 volunteers stationed around the parade route, in the staging area and our net control. The event ran on two simplex channels, one primary for the net control and the second in the staging area.

It was a very busy time in the staging area and then around the parade route as it began. The SEPAR trailer was decorated and towed as part of the parade as well. Fortunately, the weather, while cold, cooperated and it did not rain. The parade was a huge success and very well attended. We provided feedback to the organizers was to help improve things for coming years.

No major issues happened, and it was a great exercise to practice and improve skills. After the event we began discussing go kits, and what SEPAR members should have in preparation for deployment should we be needed. This also led to a discussion on what we should do if something happens in our community.

Deployment: Each week on our practice net we remind everyone that during an emergency or disaster all SEPAR members are asked to check into the repeater and if it is not operating then to go to a primary simplex frequency. We remind everyone they can start a net and with the new protocol can take check ins and note the general area where people are, their report re: power, internet, road possibility etc. Are they deployable and by what mode of transportation; foot, bike, car/truck or even transit? As we gather this information, one of the SEPAR Team will determine if





they are going to the radio room at the Fire Hall and make a report to the city with the information provided by our members. We discussed if each of us knew who the other amateur operators are who live close to us. Do we have their contact details and if they have not been reached via phone/radio could we contact them? This includes going and knocking on their door to check on them. Of course, for planned call outs, phone and email are used when available.

Go Kits

A basic portable kit should include the handheld radio of choice, a spare battery, and a means to charge the battery while away from home. It should have a good antenna and possibly a J-Pole or other gain antenna to help improve the portables performance. The radio should be programmed with the minimum SEPAR frequencies, properly named. The owner should prepare a cheat sheet with some basic how to functions on it. This would include programming a frequency, repeater with tones via the keypad, how to adjust the power level, how to go to reverse or the repeater input. Earphones should also be considered.

We have been very fortunate as SARC includes in its radio licensing class an antenna workshop. This has the students coming to the Operations and Training Center (OTC) on a Saturday and making a ladder line roll up J-Pole for the actual radio they have. They get the correct SMA (Male or Female) or BNC end on the antenna. They tune the antenna and get some practical understanding of the antenna theory in the training class. This often results in the newly licensed student then trying this antenna to check into one of our nets. We have noticed a substantial improvement in many signals when compared to the regular antenna which came with the portable radio.

The students also get to meet some of the other local amateurs and often get a brief introduction to SEPAR and how they can join us. This has helped with encouraging newly licensed hams to become active members in the club and SEPAR program. It helps build community.

Mobile Kit

The second type of go kit we discussed was the mobile kit. This typically is a higher-powered mobile radio, has a larger battery (with a means to charge the battery), the same “cheat sheet” for this radio, and a much better antenna. This could be a mag mount base with a suitable antenna. These radios might also be able to cross band repeat. If you are deployed to a location where it is hard to communicate via a hand-held radio the extra power may be what is needed to improve the communication.

Both kits can have added capability for digital communications, including Winlink, APRS and other modes. As we explore the development of “basic” kits, encouraging SEPAR members to build a kit, or “go-bag” with the minimum capabilities I will welcome input on helping define what a kit might look like. One other consideration is of course the size and weight. Depending on the task and location to which someone is assigned, there may be some variations. It was also noted that depending on how the kit is built it may also be the home base station that is transportable. This can be achieved by building the mobile kit in a hard case that you simply disconnect from your home antenna and power and take with you.

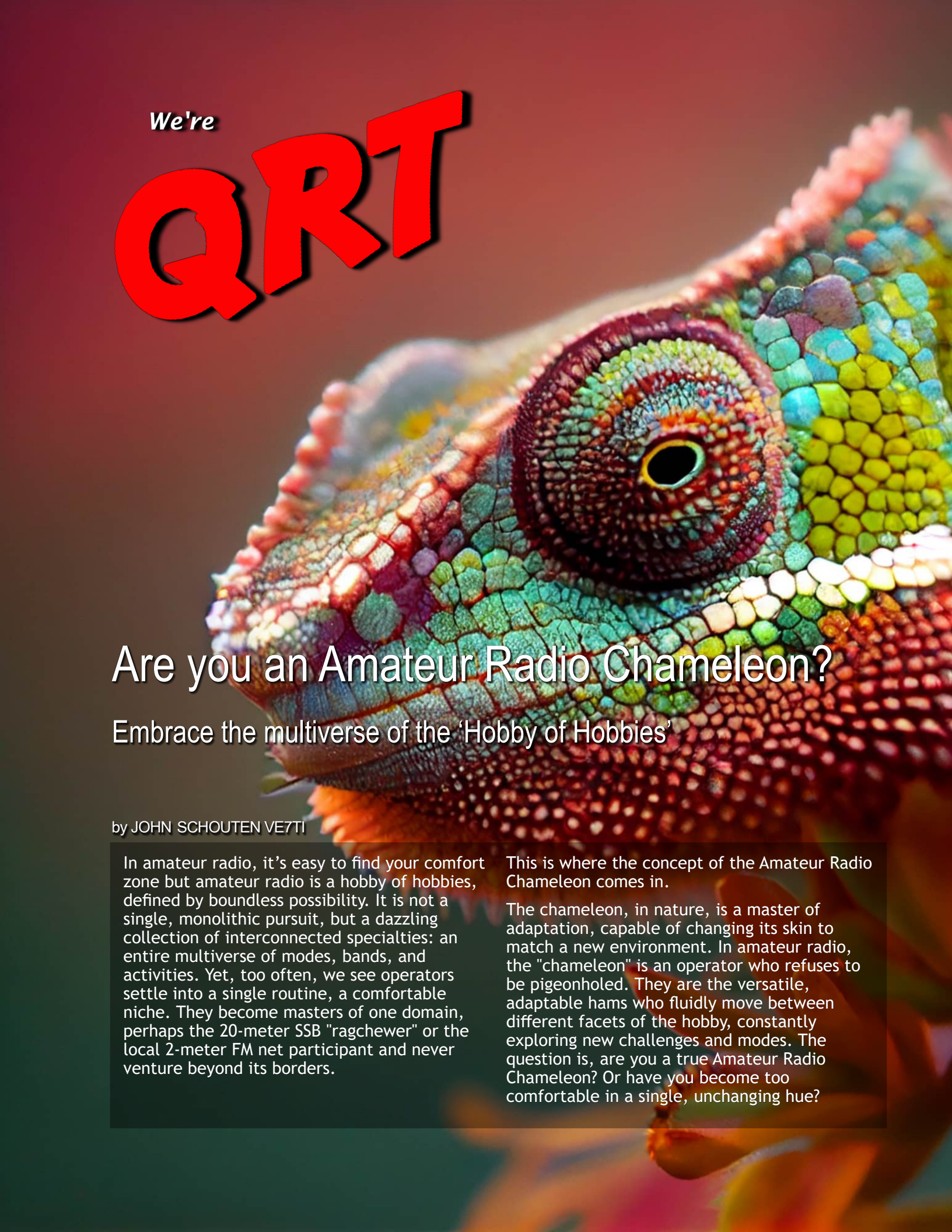
The goal is to know that SEPAR members have some basic radio preparedness, and they will arrive prepared to support communications. This discussion focuses on radio preparedness and not personal preparedness. Everyone, whether a licensed amateur or not, should be personally prepared for the minimum of 72 hours to several weeks.

We will continue to evaluate and improve our program and will welcome feedback and comments.

As always if you have any questions or want further information on the SEPAR program please reach out.

~ Gord Kirk, VA7GK
Volunteer SEPAR Coordinator

coordinator@separ.ca



We're
QRT

Are you an Amateur Radio Chameleon?

Embrace the multiverse of the 'Hobby of Hobbies'

by JOHN SCHOUTEN VE7TI

In amateur radio, it's easy to find your comfort zone but amateur radio is a hobby of hobbies, defined by boundless possibility. It is not a single, monolithic pursuit, but a dazzling collection of interconnected specialties: an entire multiverse of modes, bands, and activities. Yet, too often, we see operators settle into a single routine, a comfortable niche. They become masters of one domain, perhaps the 20-meter SSB "ragchewer" or the local 2-meter FM net participant and never venture beyond its borders.

This is where the concept of the Amateur Radio Chameleon comes in.

The chameleon, in nature, is a master of adaptation, capable of changing its skin to match a new environment. In amateur radio, the "chameleon" is an operator who refuses to be pigeonholed. They are the versatile, adaptable hams who fluidly move between different facets of the hobby, constantly exploring new challenges and modes. The question is, are you a true Amateur Radio Chameleon? Or have you become too comfortable in a single, unchanging hue?



The Comfort Zone: A Tolerable Prison

It's natural to find a corner of the hobby that resonates. Maybe you fell in love with the sheer efficiency and history of CW (Morse Code), the original digital mode. Perhaps your passion lies in the adrenaline-fueled world of Contesting, where your goal is to make as many contacts as possible in a short period. Or maybe you're a devoted POTA (Parks on the Air) operator, seeking to combine the great outdoors with portable HF operation.

These specialized areas are vital. They foster deep expertise, build strong communities, and drive innovation. But for some, this niche becomes a comfort zone—a beautiful, well-equipped, but ultimately limiting prison. The 20-meter specialist may scoff at the complexity of a digital mode like FT8 or the precision required for satellite work. The local VHF/UHF repeater user may never attempt a world-spanning DX contact on the lower HF bands. They operate in one color, convinced it is the only shade worth wearing.

But think about what you're missing. The essence of amateur radio, as defined in its core principles, is about experimentation, self-training, and service; and the challenge, curiosity, and satisfaction that come with learning something new. Stagnation runs contrary to this ethos.

The Call to Change Your Spots

Amateur radio has always rewarded curiosity more than expertise. The earliest hams didn't have manuals or online tutorials. They learned by experimenting, building, and breaking things—and they shared what they learned. That same spirit still defines the hobby. Today, we have infinite resources: online groups, digital repeaters, open-source software, and virtual Elmers everywhere. The challenge now isn't access—it's attitude.

The true Amateur Radio Chameleon views the hobby not as a single field, but as a vast, interconnected landscape. They understand that mastery in one area often provides surprising benefits in another.

- **From Voice to Data:** An operator who has spent years perfecting their SSB voice technique on 40 meters can find a whole new world of weak-signal communication by adapting to digital modes like FT8, PSK31, JS8Call, or the cutting edge IP400. The patience and understanding of propagation

they developed on voice is directly transferable, but the digital mode offers the thrill of connecting across oceans with minimal power.

- **From Base to Portable:** The ham whose shack is a fortress of equipment and huge antennas can find profound satisfaction in QRP (low power) or portable operations like SOTA (Summits on the Air). Stripping the operation down to the essentials—a simple wire antenna, a small battery, and 5 watts—forces a greater understanding of antenna physics and propagation prediction. This minimalist challenge deepens their technical knowledge in a way no high-power amplifier ever could.
- **From HF to VHF/UHF:** An obsession with global HF communication often overlooks the vital, community-focused aspects of VHF/UHF. The Chameleon knows that linking up for an ARES/RACES (emergency communication) net on a local repeater is just as valuable as logging a country on the other side of the planet. They adapt their operating style from a casual DX pursuit to a disciplined, procedural exchange, fulfilling the critical public service mission of amateur radio.

The beauty of the chameleon is that it doesn't discard its previous colors; it simply gains the ability to use a new one when the environment demands it. The Morse Code enthusiast doesn't stop tapping brass, but they might apply their speed and precision to a fast-paced digital text mode during an emergency exercise. The contester, trained in speed and efficiency, brings that same discipline to a portable Field Day setup.

The Benefits of Adaptation

Embracing the chameleon mindset offers tangible rewards that elevate the hobby beyond simple operation:

- **Deeper Technical Insight:** Every new band or mode forces you to learn new aspects of radio science—antenna design, transmission line theory, atmospheric physics, and software protocols. Understanding why a vertical antenna works well for local ground wave contacts, but a horizontal dipole is superior for skywave DX, is a lesson learned by becoming a multi-band, multi-mode operator.



- **Enhanced Preparedness:** The ultimate chameleon is the one who can operate anywhere, anytime. A ham who can seamlessly switch from a powerful base station to a battery-powered go-kit, from voice to digital, and from HF to satellite, is the most valuable asset during a communication outage. Their adaptability is the hallmark of true readiness.
- **Rekindled Excitement:** If your radio has started collecting dust, or your conversations have become repetitive, changing your "color" is the best cure for stagnation. Learning a new software suite, building a new antenna for an obscure band, or chasing a new operating award brings back the excitement of your first successful contact.

The Many Colors of Amateur Radio

So, the next time you power up your rig, ask yourself the hard question: **Am I an Amateur Radio Chameleon?**

If the answer is no, it's time to shed that old, single-hued skin. Turn your dial outside the familiar band, download that intimidating piece of digital software, or leave your warm shack for a cold hilltop or park to try a portable operation. Don't let your amateur radio journey be confined by a self-imposed niche. The whole vibrant spectrum is waiting for you.

Expanding your horizons is the best way to keep the hobby fresh and your skills sharp.

Embrace the change. Master the art of adaptation. Be the Chameleon, and truly experience the full, magnificent scope of amateur radio.

Here are five specific Chameleon Challenges

They are designed to push an amateur radio operator out of their comfort zone and encourage versatility:

1. The CW (Morse Code) Challenge: From Ragchew to Relay

If you primarily operate Voice (SSB/FM), your challenge is to achieve a meaningful conversation (a "ragchew," not just a quick contact) on CW.

- **The Goal:** Make three contacts using only Morse Code on an HF band (like 40m or 20m). One of these contacts must be for at least 10 minutes, forcing you to move beyond the basic exchange of call signs and signal reports (QSO).
- **The Change:** This forces a complete shift in operating style, demanding precision and patience over casual conversation. It sharpens your listening skills and forces you to communicate efficiently with a reduced bandwidth.
- **The Skill Gained:** You'll gain an appreciation for weak signal operation and efficiency, skills that are invaluable when band conditions are poor or when operating QRP (low power).

2. The Digital Mode Challenge: Embrace the Silent Killer

If you're a devoted CW or Voice operator, your challenge is to master a modern, keyboard-to-keyboard Digital Mode.

- **The Goal:** Successfully install and configure software (like WSJT-X for FT8/FT4 or FLDIGI for PSK31/RTTY) and log a contact with a station in a different continent (DX).
- **The Change:** This moves you from analog, human-centric communication to computer-controlled protocols and interfaces. It requires an understanding of sound card interfacing, data-to-radio keying, and the subtle art of operating with extremely low signal levels.
- **The Skill Gained:** You'll learn to use radio to move digital data and unlock communication under propagation conditions that would make traditional voice modes impossible. This is a core skill for modern emergency communications.

3. The QRP/Portable Challenge: Go Minimalist

If you operate exclusively from a fixed base station with high power (QRO), your challenge is to conduct a successful QRP (low-power) portable operation.

- **The Goal:** Go to a public park (POTA), mountain summit (SOTA), or other remote location and make at least five contacts using



5 watts of power or less and a temporary antenna (like a wire thrown over a tree).

- **The Change:** You must become an antenna wizard and a propagation analyst. When you can't rely on raw power, every component of your system—from the feedline to the antenna height—matters critically.
- **The Skill Gained:** You'll gain a deep, intuitive understanding of antenna efficiency and the relationship between solar activity and band conditions. Plus, you'll develop a reliable, self-sufficient "go-kit" for emergency use. There are lots of ideas in this, and past Communicators - just check the index.

4. The VHF/UHF Weak-Signal Challenge: Local-Range DX

If you use VHF/UHF (2m/70cm) only for local repeater traffic, your challenge is to complete a contact that **does not use a repeater**.

- **The Goal:** Log a contact with a station at least 100 miles (160 km) away using a VHF/UHF mode like SSB, CW, or FT8. This often involves leveraging non-repeater propagation modes like tropo ducting, sporadic E, or meteor scatter.
- **The Change:** You move from the friendly, casual "ragchewing" of FM to the more demanding world of directional antennas (Yagis), weak-signal operation, and tracking transient propagation events.
- **The Skill Gained:** This teaches you to work with, and utilize complex propagation

phenomena, preparing you for more advanced activities like satellite communication or Earth-Moon-Earth (EME) contacts. It also enhances your skills should you find yourself in an emergency, without cell phone coverage or the Internet.

5. The Maker Challenge: Build a Component

If you only buy and operate commercial, factory-built equipment, your challenge is to build a functional piece of equipment yourself.

- **The Goal:** Build and successfully test an essential accessory, such as a simple wire antenna (like an End-Fed Half Wave), a QRP transceiver kit (like a Pixie or QCX), or a low-pass/high-pass filter. Then, use it to make a contact. Again, lots of examples of easy antennas in past Communicators - just check the index.
- **The Change:** You shift your focus from operating to engineering. You move from the user's side of the hobby to the designer's side, learning about soldering, component selection, and testing with a meter.
- **The Skill Gained:** This is the ultimate self-training exercise. It instills an ability to troubleshoot and repair your own equipment and fundamentally deepens your understanding of how radio waves are generated and radiated.

Do these challenges not inspire you? Check out our '[52-Week Ham Radio Challenge](#)' website. You're sure to find something of interest there.

Which of these challenges sounds most appealing to you? We have willing Elmers locally at SARC/SEPAR and I'm certain there are some in your area able to guide you along your path to becoming a chameleon.

It's January 2026, make a start now.

Happy New Year.

73,

~John VE7TI



Keep pace with the chameleon challenges at:
<https://www.ve7sar.net/communicator/featured/chameleons>

HAM LEFTOVERS...

That's all I did

Joe Walsh WB6ACU Reveals the Surprising Way He Ended Up Learning Morse Code as a Kid: ['That's All I Did'](#)

Antenna Stuff

Kurt OZ7OU, reminds us that the free Arie Voors program [4NEC2 antenna modeler and optimizer](#) is a fantastic tool. Simply draw the antenna in a graphical editor and then simulate impedances across a frequency range, create circular and 3D color radiation patterns. Amazing stuff, really!

Eliminate your high noise floor

A link to this video appeared on the amateur radio subreddit. It shows you how to build a filter to eliminate any RFI coming in through the power line. Watch it at: <https://youtu.be/styV63U5Yws>

From the RSGB: Making use of emerging technologies

The Radio Society of Great Britain has published a web page on Emerging technologies which, the RSGB suggests, offer the opportunity to broaden the definition of amateur radio and increase appeal, attracting a more diverse audience. As technology develops so does the hobby, from the widespread use of Artificial Intelligence, to the benefits of 3D printing. New technologies also offer existing amateurs the opportunity to progress and enhance their own experience by learning new skills.

Of several examples and links provided, one was quite intriguing: "[Using AI to write applications](#)". Large language models such as ChatGPT and Google Bard/Gemini have the ability to transform the way that we write software. Using software such as these can significantly improve productivity and bring the ability to write effective software within the reach of more people.

Ham radio operators officially now a part of national emergency response

The [Manitoulin Expositor](#) had a story about RAC President Al Boyd VE3AJB and the acceptance of RAC's Auxiliary Communications Service as part of Canada's national emergency response plan. "ACS will "assume the original function of ARES, but its focus will shift to recognize that disaster response management and telecommunication standards are now mandated by Canadian federal, provincial and territorial legislation and regulations and by international agreements."



Thank you recent visitors... 166 countries and counting—more than in my log!

	33,628		248		72		20		8		3		2		1
	21,857		217		72		17		7		3		2		1
	13,529		208		70		15		6		3		2		1
	3,738		190		70		14		6		3		2		1
	2,341		189		64		13		6		3		2		1
	2,005		188		48		13		6		3		2		1
	931		188		48		12		5		3		2		1
	903		181		46		12		5		3		2		1
	739		180		45		12		5		3		2		1
	733		176		43		11		5		3		2		1
	705		176		39		11		4		3		1		1
	587		174		34		11		4		2		1		1
	544		141		33		11		4		2		1		1
	452		115		31		11		4		2		1		1
	439		114		30		10		4		2		1		1
	375		106		30		10		4		2		1		1
	370		100		28		10		4		2		1		1
	351		93		28		9		4		2		1		1
	327		88		27		9		4		2		1		1
	307		82		20		9		4		2		1		1
	306		81		20		8		4		2		1		1

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A look back...

at The Communicator—January 2016

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The Surrey Amateur Radio Club

Communicator



**Happy
New
Year**

- Looking Back On 2015

The Newsletter of the Surrey Amateur Radio Club

Read about it at:

https://archive.org/details/SARC_Communicator_2016-01/mode/2up?q=The+Communicator

Past Communicators are available at:

[Past Communicator Issues](#)

or search the complete Communicator contents & index at:

[SARCindex](#)

January & February

Down The Log...

We will be meeting via Zoom for both January and February to get away from driving during our wettest and darkest months. Two exciting speakers have been arranged.

On **January 14, 2026** our presenter is Jim Idelson K1IR. Jim will speak on his work in tower safety. One of his observations is that the younger cohorts seem to be more interested and willing to learn and adopt new behaviours in pursuit of a safer experience.

On **February 11, 2026** our presenter is Greg Mihran, KJ6ER. Greg has been a recent contributor to The Communicator and he is the developer of the PERformer, Challenger and Dominator portable antennas for POTA, SOTA, Emergency Communications and HOA Deployments. These are highly efficient homebrew portable antennas that he has used for POTA (Parks On The Air) activations over the past few years.

Hope to see you there.

On the Web ve7sar.net

Between Communicators, watch your e-mail for news, announcements of Amateur Radio events, monthly meetings and training opportunities.

Click the links below to follow our presence on the web and social media:

SARC Blog
ve7sar.blogspot.ca

Bluesky (No more 'X')
[#ve7sar.bsky.social](https://bsky.app/profile/ve7sar)

FaceBook
[SurreyAmateurRadio](https://www.facebook.com/SurreyAmateurRadio)

Our YouTube Channel
[SurreyARC](https://www.youtube.com/SurreyARC)

Weekly Tuesday Evening SARC and SEPAR Nets

Join the SEPAR net every Tuesday at 7:30 pm and the SARC net at 8 pm on either of the repeaters: North repeater on 147.360 MHz +600 KHz, tone 110.9 Hz and South repeater on 147.360 MHz + 600 KHz, tone 103.5 Hz. You can also join via IRLP (node 1736) and Echolink (node 496228) which are available only on the North repeater.

Monthly 220 MHz Net

The 220 Net has moved to the last Thursday of each month at 7:30 pm on our 220 repeater at 223.960 - 1.6 MHz, tone 110.9 Hz. This is not a "chat" net – just check in and exchange signal reports.

Monthly UHF Net

Darryl VA7CQD hosts a monthly UHF net held at 7:30 pm on the first Sunday of each month on SARC's UHF repeater 443.775 MHz+5 MHz tone 110.9 Hz. This is a non-chat net; just check in and carry on with your evening.

SARC Monthly Meetings

2nd Wed. (Sept-Jun)
1900 hrs at the [Surrey Fire Service Training Centre](#),
14923 - 64 Avenue,
Surrey, BC.

Here is a what3words link and map: <https://what3words.com/markers.addiction.ozone>

Weekly SARC Social

Saturday between 0730 and 0930 hrs at the Denny's Restaurant, 6850 King George Blvd., Surrey BC

Workshops

Saturday between 1000 and Noon at the OTC
5756 142 Street, Surrey

SEPAR Net

Tuesday at 1930 hrs local

SARC Net

Tuesday at 2000 hrs local

VE7RSC Repeaters

2m North: 147.360MHz+
Tone=110.9Hz
IRLP node 1736
Echolink node 496228

2m South: 147.360MHz+
Tone=103.5Hz Fusion
capable; No IRLP/EchoLink

1.2m: 223.960 Mhz -1.6
Tone=110.9Hz

70cm: 443.775MHz+
Tone= 110.9Hz
IRLP node 1737
WiRES-X Room ID 00047

THE CANADIAN AMATEUR

JANUARY / FEBRUARY – JANVIER / FÉVRIER 2026



The Importance of Showing Up! Everywhere!



Publications and Agreements of Copyright Registration & Other

The Canadian Amateur (TCA),

Canada's premiere national magazine devoted to Amateur Radio, is published six times per year and is the membership journal of the Radio Amateurs of Canada (RAC). It is available in both print and digital versions (eTCA). Members of RAC, Canada's sole national Amateur Radio organization, receive TCA automatically.

A subscription to TCA also provides membership in Radio Amateurs of Canada. RAC is also the publisher of TCA. For information on how to join Radio Amateurs of Canada and subscribe to TCA please visit our [Membership Sign Up page](#).

At 64-pages per issue and reaching approximately 4,500 readers, TCA offers news and views on the Canadian Amateur Radio scene from coast to coast to coast. It includes regular columns, features and technical articles of interest to Amateur Radio operators. In addition, a Coming Events calendar, Feedback, QSL Bureau information and coverage of regulatory issues are also provided.

If you would like additional information about The Canadian Amateur magazine please contact the Editor Alan Griffin at tcamag@yahoo.ca.


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